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A GUIDE *to the* TREES

UNIFORM WITH THIS VOLUME

A Guide to the Wild Flowers

By Alice Lounsberry and Mrs. Ellis Rowan

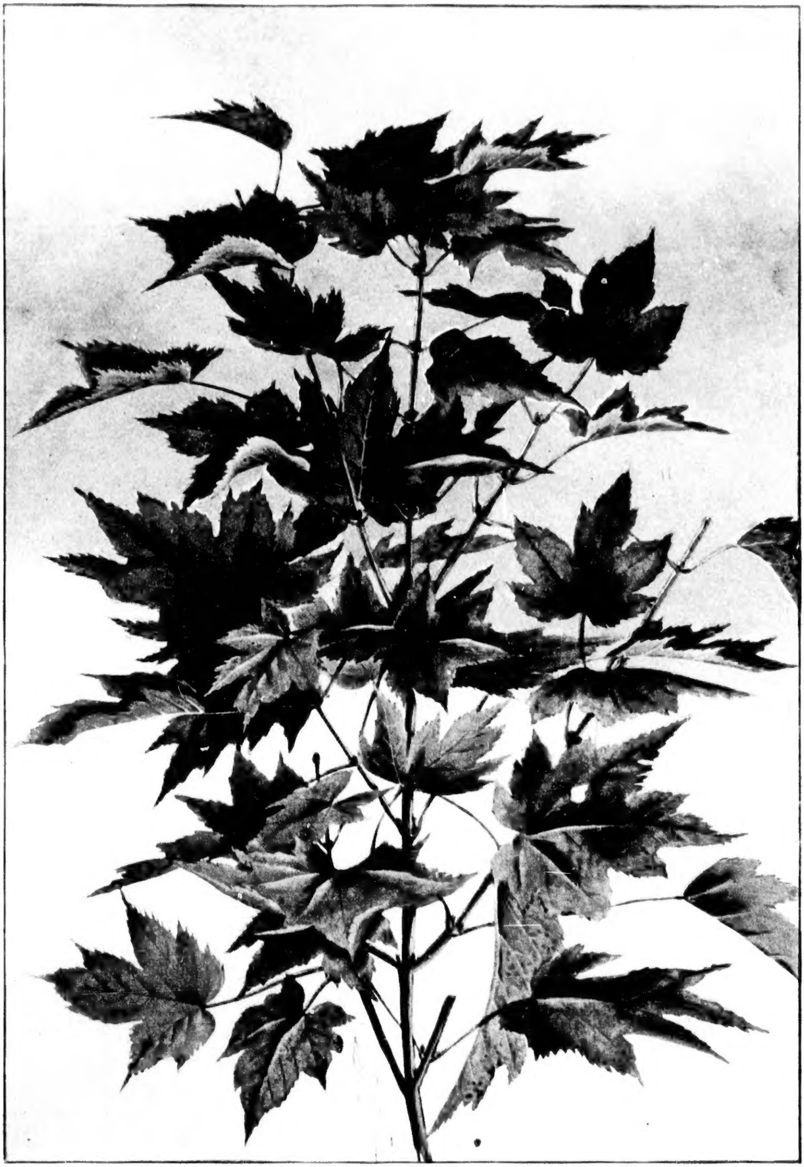

PLATE XXXV. RED MAPLE. *Acer rubrum.* *Frontispiece.*

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A GUIDE
TO THE
TREES

BY
ALICE LOUNSBERRY
Author of "A Guide to the Wild Flowers"

WITH SIXTY-FOUR COLOURED AND ONE HUNDRED AND SIXTY-FOUR BLACK-AND-WHITE PLATES AND FIFTY-FIVE DIAGRAMS

BY
MRS. ELLIS ROWAN
Illustrator of "A Guide to the Wild Flowers"

With an Introduction
BY
DR. N. L. BRITTON
Emeritus Professor of Botany, Columbia University, Author of "An Illustrated Flora," and Director-in-Chief of the New York Botanical Garden.

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Preface.

THERE is a solemnity, a repose about the great trees, and the restless, ceaseless stirring of the small ones is full of mystery. So self-evident are they, so close at hand that we almost find ourselves in danger of becoming oblivious to their presence. They never intrude upon the attention; they rather pursue indomitably their own way. As landmarks of history many trees have been revered; traditions and superstitions have clustered about them while in mute eloquence they have answered the people's expectations. In England, to-day, there are oaks standing that knew the ground before its conquest by the Romans. Nothing is grander than are trees. Nothing gives of its best more freely to man. And to each one there is an individuality which having once been observed may be traced into the folk-lore of nations. But before the trees can truly impress us, before we can appreciate them in their fullest expression, we should know something of them scientifically,—their manner of growth, their sources of life and the often subtle differences which separate them into families and genera and species. Later we may forget these things, and regard them simply from the standpoint of their appearance. To combine, therefore, a necessary amount of scientific knowledge while not to lose sight of the character and recognised place each tree holds in its great world has been an aim in the writing of "A Guide to the Trees."

Nearly two hundred trees and some shrubs have been herein included. Among them are all those prominent in Northeastern America and a few distinctive and rare species from the south and west. Several also that are not indigenous but which have become identified with the tree-life of this country have been presented. That their positions may, after a simple means, be located in the book, they have primarily been classified according to the soil in which they prefer to grow. This is always a notable point, and it is mostly in cultivation that we see them thriving under other conditions of soil than those of their natural habitat. A river-loving tree is ever loath to sacrifice its desire for moisture, and the ones from the dry hilltops are chary of venturing into the swamps. Trees that prefer to grow near water are placed in the first section, then follow those of moist soil, those of rich soil, those of sandy or rocky soil and those of dry soil respectively. Within these five sections the order in which they have been arranged has been with a regard to the peculiarities of their leaves. The simplest forms, those with entire edges, and which grow alternately on the branches, are placed first, and through their variations such leaves continue to follow until those with lobed edges are reached. Simple, opposite leaves are next, and are arranged in the same order, relating to the character of their margins. Then following in the same way are compound, alternate leaves, and finally compound, opposite leaves. Towards the end of the sections will be found the coniferous trees.

The descriptions of the trees are headed by their common name, or by several common names when they exist, and by their scientific name. These latter are in accordance with those sanctioned by Professor Sargent and Dr. Britton. So that the eye can quickly find them are then set forth the family, shape, height, range and time of bloom of the plants. An analysis of their parts is given, in which the special features of the bark, the leaves, the bloom and the fruit are mentioned. Throughout the book no technical terms have been used that are not explained in the chapter, "Illustrated Terms."

As the leading points of recognition in connection with the trees have been thus concisely given, the privilege has been taken of admitting into the text any impressions or notes of interest that the trees have themselves suggested.

In the chapter, "The Growth of the Trees," the story is simply told of their development from the seed into a full-grown tree. To know something of their ways and struggle for life cannot but add deeply to the interest they inspire. Stress also has been laid on the blooming of the trees, for although the advantages of a trained observation are being more keenly realised, there are still many that are quite unconscious of the beauty and fineness of many of their flowers. To see the hanging crimson bloom of the red maple is as beautiful—although in a different way—as the unfolding of the magnolias.

An advanced and exquisite feature of the book is its sixty-four illustrations in colour. The originals were painted by Mrs. Rowan with great spirit and accuracy. One hundred pen-and-ink sketches form excellent studies and the many small representations of trees are very attractive. No labour has, in fact, been spared that the book may satisfactorily fill the gap there seems to be for such an one.

It is with the greatest pleasure that mention is here made of the encouragement that has been given to the writing of "A Guide to the Trees." All that have known of its progress have shown in it a kind interest. Especially is it desired to express appreciation of the impetus given to the work by Mr. George Vanderbilt, who has done much to further the valuable study of forestry. From his herbarium fresh specimens were continually supplied to Mrs. Rowan and which for illustrating she found of inestimable value. To Mr. Beadle, the botanist of Biltmore, the most grateful thanks are due, for through his collaboration many difficult tangles were pleasantly unravelled. To devote his time to Mrs. Rowan and Miss Lounsberry, and to give freely from his fund of accurate knowledge he was ever ready during their stay at Biltmore. His assistants also were most kind and helpful. Dr. Charles Mohr has contributed information about the bald cypress, and in many ways Dr. Britton's advice has been of importance.

Away to the trees then let us go,
For it matters not whether there's rain or snow
They wait for us.

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Introduction.

TREES are among the most familiar objects in Nature, and among the most easily observed and studied; yet how few people know one from another or have an intelligent understanding of their life history! Again, they are among the most important, in their widely different fields of usefulness, furnishing as they do, wood for building, tools, implements, the manifold kinds of construction, and for fuel; fruits, fibres, resins, gums, drugs and a host of other useful products; shade and seclusion; ornaments for our parks, lawns and highways, while our forests, too long neglected, are coming to be recognised, after years of education of the people, as having an all-important relationship to the flow of streams by conserving the rainfall and distributing it normally and gradually, thus naturally regulating our water-supply. Anything that brings trees more closely to our attention, and that makes us realise their great importance is of distinct value as an educational agent.

The greater size of trees as compared with shrubs and herbs tends to make them regarded by many as a group of objects essentially different from other plants, so much so that we frequently read statements concerning "Trees, shrubs and plants." And yet a tree is not, except in size, so very different in its essential structure from its humbler relatives of the plant community; it has roots, a stem, leaves, flowers, fruit and seed, as they have; the fact that all trees bear flowers of one kind or another is perhaps not so generally appreciated as its possession of the other parts mentioned, due, doubtless, to the flowers of many of them being insignificant in size, unimpressive in colour, and appearing so early in the season that they are neither looked for nor noticed.

That trees have a very well-defined preference as to the character of the soils in which they grow most readily and healthily is a generalization that is unfamiliar to many, and that their surroundings and kind of exposure affect their growth to a large degree will also be a new idea to some.

All these lessons, and a great many more, will be found in detail in the pages of this beautiful book, and they are taught in language which will be readily intelligible to all, while the concise descriptions of the different trees, and of their parts, taken in connection with the profuse and excellent illustrations, will make easy and attractive the identification of all kinds ordinarily met with in Eastern North America.

N. L. BRITTON.

NEW YORK BOTANICAL GARDEN,
March 5, 1900.

Illustrated Terms.*

In the minds of those that have stepped for awhile out of the routine of life and are walking abroad with nature, there seems to lurk a resentment of all restraint. The freedom of the atmosphere stirs in their nostrils. To have much to do with botany and technical terms on such an occasion has especially been supposed to blunt the keenness of one's pleasure. Whether this be true or not is a matter for the individual to decide. It must be granted, however, that there are certain terms that we should all know, and which can in no way come between us and a close friendship with nature ; they rather help us to express our thoughts of the vegetable world more clearly and to have a better understanding of, and intimacy with, all that grows.

The technical terms that are used throughout "A Guide to the Trees" are simply defined in the present chapter. By reference to it, it is thought that even those most unskilled in the study of plant life will be able to comprehend the analyses that have been given of the trees and to become conversant with the principal points to be noticed when identifying species.

Trees are the grandest members of the vegetable world. They are distinguished from shrubs by their greater size and because they spring from the ground with a single, erect and usually branching trunk.

Their organs of vegetation are the root, the trunk and branches and the leaves.

Their organs of reproduction are the products of the flower: the fruit and its seeds.

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* When suitable for this chapter, the terms and illustrations have been repeated from "A Guide to the Wild Flowers."

The **Root** is the simplest organ of the tree. Its function is to absorb nourishment and moisture from the soil, and in it to firmly anchor the tree.

Simple Primary Roots are those which grow singly from the base of the seedling and form a main or tap root. They then are either lost in their branches or they remain distinct and send off side branches.

Multiple Primary Roots are so called because several, or a cluster of roots, grow simultaneously from the base of the seedling.

The **Stems** of trees are **Arboreous**—that is they differ from those of other plants in forming a proper tree trunk.

The **Exogenous Stem** (outside-growing) is the one that belongs to all northern trees and shrubs. In it the pith, or cellular tissue of the centre is, in large trunks, usually insignificant in quantity, and is surrounded by a zone of wood which in its turn is encased in an outer bark. That the wood occurs in a larger proportion than do its other parts, is often the only difference in arrangement between the stem of a young tree and that of an herb.

The **Bark** of a tree is divided into the inner and outer barks.

The **Inner Bark** is called the **Liber** or **Fibrous Bark**.

The **Outer** or **Cellular Bark** is divided into two layers: the **Green** or **Inner Layer** and the **Corky** or **Outer Layer**.

Sap-Wood or **Alburnum** is the outermost layers of wood through which the sap most freely flows.

Heart-Wood is the name given to the inner layers of wood.

The **Endogenous Stem** (inside-growing) has no distinct arrangement of pith, wood and bark. Throughout its whole interior the threads of wood are irregularly scattered.

Leaf-Buds are branches or leafy shoots not yet developed. They may be either terminal or axillary.

Terminal Buds grow at the summit of the stem or branches.

Axillary Buds grow in the axils of the leaves: they are also called **Lateral Buds** because they appear on the sides of the stem or branches.

Naked Buds are those that are without coverings or scales.

Scaly Buds are protected by scales.

Latent Buds are those that commonly lie hidden and dormant until some circumstance causes them to grow.

Adventitious Buds usually appear without any order and in unexpected places. In their development they often serve to replace some part of the tree that has been injured.

Suckers are ascending branches which arise from subterraneous parts of the stem. Adventitious shoots are also sometimes called suckers.

Thorns are slender, sharp-pointed, modified branches which are useful to protect a tree from the ravages of small animals.

Leaves are the digestive organs of a tree and assimilate the sap that has been absorbed by the roots into material for sustaining and building up its tissues. They grow from leaf-buds and may be regarded as appendages of the stem. The different ways in which they are arranged upon the branches are:—

Alternate when they are borne singly at the nodes. (FIG. 1.)

Opposite when two grow at each node of the stem and have its semi-circle between them. (FIG. 2.)

Whorled when they grow in a circle about the stem. (FIG. 3.)

The PARTS OF A LEAF are its **Blade**, the broad or expanded portion which is a fibrous network of veins supporting the green pulp or soft cellular tissue; the individual stalk upon which the blade is raised, called the **Petiole**; and the **Stipules,** or a pair of usually flat bodies, often blade-like, at the base of the petiole. (FIG. 4.) These latter are often inconspicuous or absent. All parts of the leaf are covered by a thin and transparent epidermis.

The main branches of the leaf's framework are called the **Ribs** or **Veins**: and the MIDRIB OR MIDVEIN is the middle one when it is longer and more prominent than the others. (Fig. 4.) The numerous sub-divisions of the framework, **Veinlets**, and the finest of these **Veinulets**.

In regard to their venation, leaves are divided into (1) those that are **Netted-Veined** and (2) those that are **Parallel-Veined**. This feature is invariably in accord with the shape and character of the leaf and should therefore be most carefully observed.

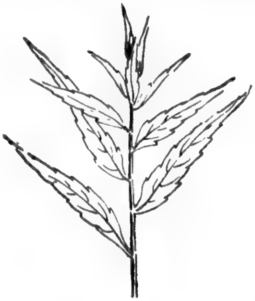
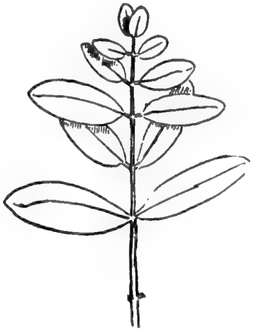


FIG. 1.



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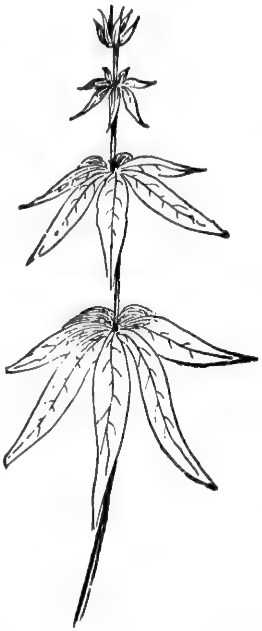

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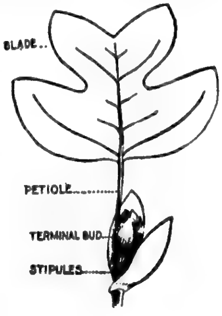

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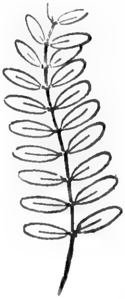


FIG. 5.

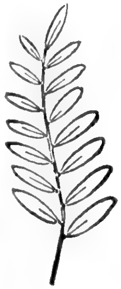
1. **Netted-Veined Leaves** are those in which the veins branch off from the midrib and again branch into veinlets that run together and form a mesh or network. (Fig. 11.)

Feather-Veined or **Pinnately-Veined Leaves** are netted-veined leaves wherein the veins, from the base to the apex of the leaf, all branch from the sides of the midrib. (FIG. 12.)

Palmately-Veined Leaves have several veins of almost equal size which branch from the same point at the base of the blade and spread out at different angles towards the margin. (FIG. 26.)

2. **Parallel-Veined Leaves** are those in which the main veins run side by side without branching or running together, unless it is by a few almost imperceptible cross-veinlets. (FIG. 10.)

It is according therefore to the structure of their framework that leaves assume their great variety of forms. The two classes into which they are divided are: **Simple Leaves** and **Compound Leaves.**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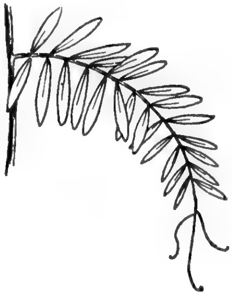
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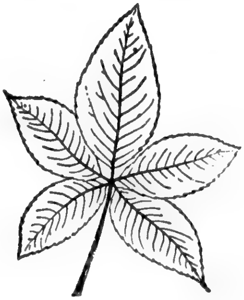


FIG. 8.

Simple Leaves are those wherein the blade is unbroken.

Compound Leaves are those that have the blade split into separate parts: each part then forms a leaflet which may be without, or have a little stalklet of its own.

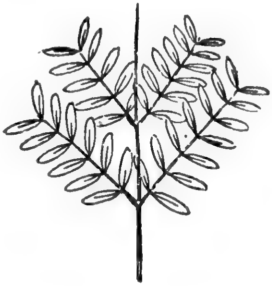
When the leaflets in a compound leaf are at the side of the blade, and arranged as in feather-veined or pinnately-veined leaves they are said to be **Pinnate**. In this form they occur as **Abruptly Pinnate,** when the stalk is terminated by a pair of leaflets. (FIG. 5.) **Odd-Pinnate,** when an odd leaflet terminates the stalk (FIG. 6.); and again in another form when the end leaflet is changed into a tendril, the purpose of which is to help the plant in climbing, (Fig. 7.) as in many vines.

Palmately Compound Leaves have the leaflets arranged as in a palmately-veined leaf. (Fig. 8.)

Leaves may be twice, thrice or more times compound. (Fig. 9.) Their leaflets are subject to all the variations of simple leaves.

The most common forms of leaves and leaflets are designated by the following terms:—

Linear: the narrowest form of a leaf, several times longer than broad: grass-like. (Fig. 10.)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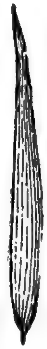
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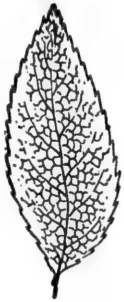


FIG. 11.

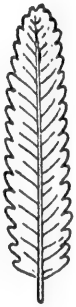


FIG. 12.

Lanceolate: long and narrow, slightly broader at or near the base and tapering towards the apex. (Figs. 1 and 3.)

Oblanceolate: a reversed lanceolate.

Oblong: when two or three times longer than broad. (Fig. 12.)

Elliptical: oblong and tapering at both ends. (Fig. 13.)

Oval: broadly-elliptical. (Fig. 14.)

Ovate: when the outline is similar to the long-section of an egg; the broader end downward. (Fig. 15.)

Obovate: a reversed ovate.

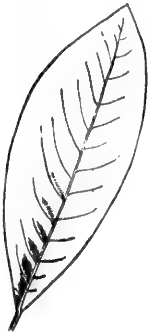
Spatulate: like a spatula, rounded at the apex and tapering towards the base. (FIG. 16.)

Orbicular, nearly circular in outline.

Peltate or **Shield-Shaped:** orbicular, with the petiole attached at or near the middle. (FIG. 17.)

Cordate or **Heart-Shaped:** ovate in outline, and having sides that form a notch at the base. (FIG. 18.)

Obcordate: a reversed cordate.



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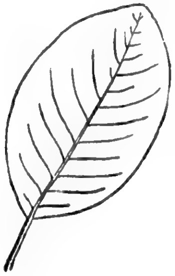

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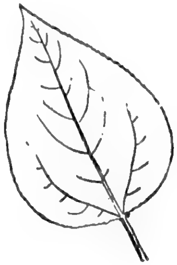

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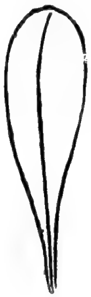


FIG. 16.

Reniform or **Kidney-Shaped:** when the indentation is deeper and the leaf more rounded than heart-shaped. (FIG. 19.)

Auriculate: when the sides of the leaf are prolonged at the base into two ears or lobes. (FIG. 20.)

Sagittate or **Arrow-Shaped:** when pointed at the apex and having the lobes at the base acute and pointed backward. (FIG. 21.)

To describe the peculiarities of the margins of leaves such terms are employed as:—

Entire: those leaves in which the margins form an unbroken line. (FIG. 13.)

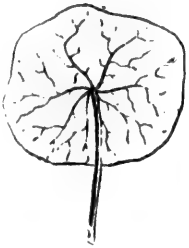
Undulate: when the margins are wavy. (FIG. 22.)

Crenate: when the margins have rounded teeth or appear to be scalloped. (FIG. 12.)

Serrate: when the margins have short, sharp teeth which point forward. (Fig. 11.)

Incised: when the teeth of the margin are coarse and jagged and extend quite far into the leaf. (Fig. 23.)

Lobed: when the incisions of the margin extend about half way to the midrib and in which case the leaf is spoken of as being three-lobed, five-lobed, or according to the number of lobes that are formed. (Fig. 24.)



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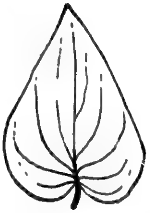

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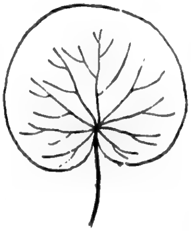

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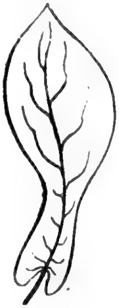


FIG. 20.

Cleft: when the incisions of the margin reach more than half way to the midrib. (Fig. 25.)

Divided: when the incisions extend to the midrib. (Fig. 26.)

The **Sinuses** of a leaf are the hollows, or curves that are formed between the projecting teeth, or lobes.

According to the roughness or smoothness of their surfaces, leaves, and in fact, any of the parts of a tree are said to be :—

Glabrous: when the surface is not provided with down, or hairs.

Pubescent: when provided with fine hairs, or downy.

Tomentose: when covered with hairs that are matted and woolly.

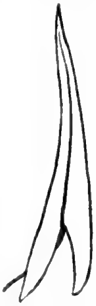
Glaucous; when the surface is covered with a powdery substance, waxy in nature, called a bloom.

The **Inflorescence** is the manner in which the flowers are arranged upon the stem. It may be either **Determinate** or **Indeterminate.** When it is determinate the flowers have all grown from terminal buds. An indeterminate inflorescence expresses that they have grown from axillary or lateral buds.

A **Pedicel** is the individual stalk of a flower that is borne in a cluster.

A **Peduncle** is the stalk of a solitary flower, or the common stalk that bears a cluster.

Sessile is the term used when the leaves or flowers grow closely to the stem or branch, and are without either pedicel or peduncle.



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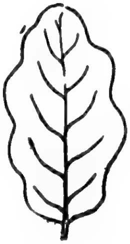

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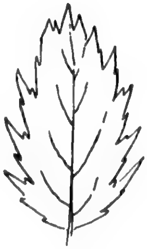

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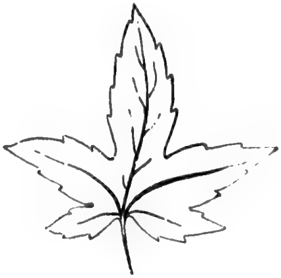


FIG. 24.

When but one flower grows on the end of the stem or flower-stalk, it is said to be **Terminal, Solitary.** (FIG. 43.)

It is **Axillary** when the flower, or flowers, grow from the axils of the leaves; that is in the angle formed by the leaf, or leaf-stalk, and the stem. (FIG. 27.)

A **Raceme** is a flower-cluster in which the flowers grow on pedicels that are about equally long, and are arranged along the sides of a common stalk. (FIG. 28.)

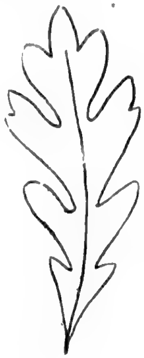
A **Panicle** is a compound raceme. (FIG. 29.)

A **Thysus** is a panicle when very compact, and oblong, or pyramidal in shape. (FIG. 30.)

A **Spike** is like a raceme, only the flowers are sessile. (Fig. 31.)

A **Catkin** or **Ament** is a scaly sort of spike in which the flowers are without petals. Staminate Catkin, (Fig. 32.) Pistillate Catkin, (Fig. 33.)

A **Head** or **Capitulum** is a short, dense spike that is globular in form. (Fig. 34.)



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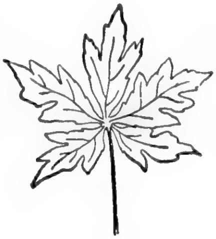
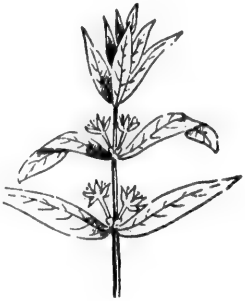


FIG. 26.



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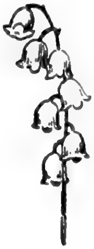


FIG. 28.

A **Corymb** is like a raceme, but the lower pedicels are elongated so that the flowers all reach about the same height. (Fig. 35.)

An **Umbel** is like a corymb, only the pedicels branch from the same central point, suggesting the ribs of an umbrella. It may be simple or compound. (Fig. 36.)

A **Cyme** is a flat-topped flower-cluster, differing from an umbel in that its innermost flowers are the first to open. (Fig. 37.)

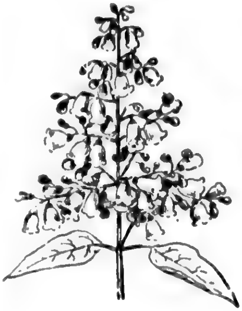
Bracts are the modified leaves of an inflorescence, or those that are under a flower. Usually they are green and of different size and shape than the rest of the foliage; sometimes, however, they are highly-coloured and petal-like.

Many trees bear both staminate and pistillate blossoms which are often separate.

A **Staminate Flower** is one that has stamens but no pistils.

A **Pistillate Flower** is one that has pistils but no stamens.

When both staminate and pistillate flowers are borne on the same tree it is called **Monœcious,** in one household; when they are borne on different trees they are spoken of as being **Diœcious,** in two households.



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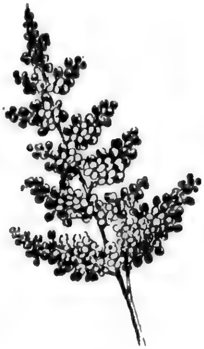

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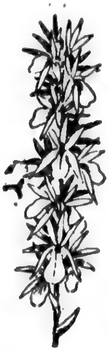

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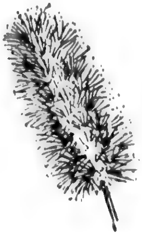
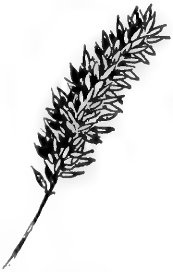


FIG. 32.

Flowers that possess both of the essential organs of reproduction, the stamens and pistils, are **Perfect Flowers.** The reverse are **Imperfect Flowers.**



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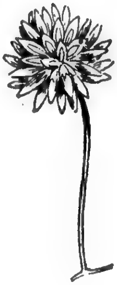

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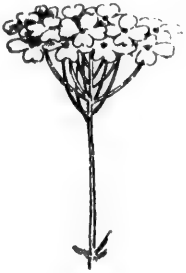


FIG. 35.

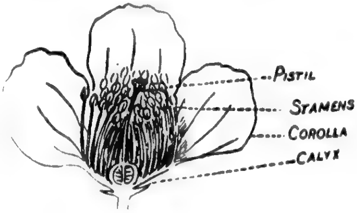
Neutral Flowers have neither stamens nor pistils.

A **Complete Flower** is one that is provided with the essential organs of reproduction, the stamens and pistil; and the protection organs, the calyx and corolla. (FIG. 38.) **Incomplete Flowers** lack one of the four organs or more.

Regular Flowers are those that have the parts of each set of organs alike in size and form. (FIG. 39.) **Irregular Flowers** have the parts of one set of organs or more unlike in size or shape. (FIG. 40.)

FIG. 36.

FIG. 37.



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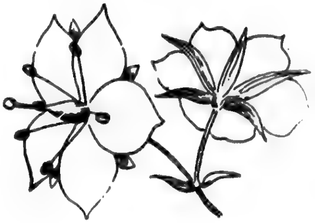


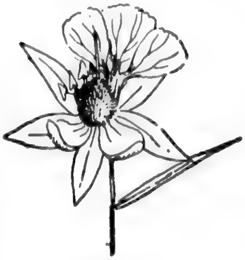
FIG. 39.

The parts then of a COMPLETE flower are the calyx and corolla; the stamens and pistil.

The **Calyx** (FIG. 38) is the outer set of leaves at the base of the flower which rests upon the receptacle or end of the flower-stalk. The **Sepals** are the leaves of the calyx when it is divided to the base, and in which case it is said to be **Polysepalous.** When, however, the sepals are wholly or partly grown together the calyx is **Gamosepalous.**

The **Corolla** is the inner and upper set of leaves. It is the alluring part of the flower, and is supposed to attract insects to its whereabouts that its pollen may be carried through their agency. The **Petals** are the leaves of the corolla when it is divided to its base. It is then said to be **Polypetalous.** The corolla is **Gamopetalous** when the petals are wholly or partly grown together.

The **Calyx** and **Corolla** are spoken of as parted when they are divided nearly to the base. When they are divided about to their middle, they are said to be cleft, or lobed. They are toothed when the lobes are very small.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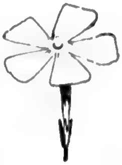
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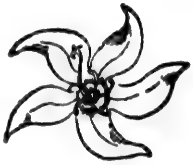


FIG. 42.

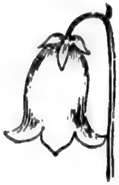


FIG. 43.

When the parts of the **Calyx** and **Corolla** are united, some of the terms used to express their different forms are :—

Salver-Shaped: when the border is flat and spreads out at right angles from the top of the tube. (FIG. 41.)

Wheel-Shaped: when the border spreads out at once from a very short tube and suggests the diverging spokes of a wheel. (FIG. 42.)

Campanulate, or **Bell-Shaped:** when the tube expands towards the summit and has no border, or only a very short one. (FIG. 43.)

Funnel-Form: when the tube is narrow below and gradually spreads to a wide border. (FIG. 44.)

Tubular: when the tube is prolonged and does not widen much towards the summit. (FIG. 45.)

Labiate: when there is an apparently two-lipped division of the parts. In this form of corolla usually two petals grow together and make the upper lip; the remaining three petals join together and form the lower lip. These divisions appear mostly as lobes, and it is not always noticed that the corolla has five lobes instead of two. (FIG. 46.)

The preceding forms which have been cited are those that belong to the gamopetalous division. The following terms are peculiar to polypetalous corollas:—

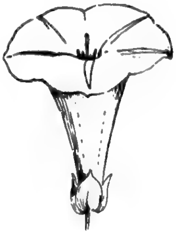


FIG. 44.

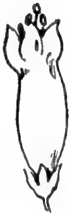


FIG. 45.

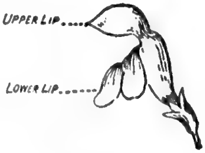


FIG. 46.

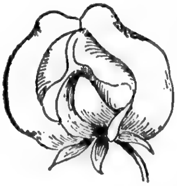


FIG. 47.

Rosaceous: when the petals are distinct and without claws, as in the rose.

Papilionaceous, or **Butterfly-Shaped.** (FIG. 47.) Such flowers are usually described in three parts: the **Banner,** or **Standard,** which is the large upper petal; the **Wings,** or the two side petals, and the two anterior petals that, commonly united in a shape something like the prow of a boat and enclosing the reproducing organs, are called the **Keel.** (FIG. 48.)

The **Stamens** or **Fertilizing Organs** of a plant are composed of two parts: the **Filament**, or stalk, which is useful to uphold the **Anther**; and the **Anther,** a tiny two-celled box, which contains the **Pollen.** The **Pollen** is the yellow fertilizing dust which is the essential product of the stamens. (FIG. 49.)

Exserted Stamens are those that protrude from the corolla.

Included Stamens are those that are within the corolla.

The **Pistil** or **Seed-Bearing Organ** is divided into three parts: the **Ovary,** the **Style** and the **Stigma.** (FIG. 50.)

The **Ovary** is the lower, expanded part of the pistil which contains the ovules, or undeveloped seeds. (FIG. 50.)

The **Style** is the slender stalk that usually surmounts the ovary. (FIG. 50.)

The **Stigma** is the flat or variously formed body that terminates the style. (FIG. 50.) Unlike the other organs of the plant, it is not covered by a thin skin or epidermis. Its surface is, therefore, moist and rough, so that it readily receives and holds the pollen when it is deposited upon its surface.

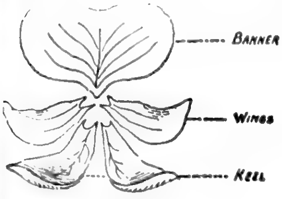


FIG. 48.

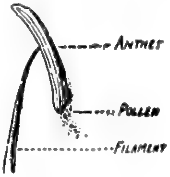


FIG. 49.

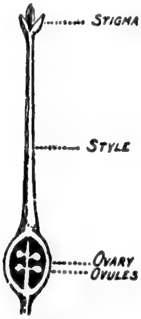


FIG. 50.

FIG. 51.

FIG. 52.

Each tiny pollen grain that alights upon the stigma sends out from its under surface a minute tube which pierces down through the style until it reaches an ovule below, which it quickens into life. This is known as the process of **Fertilization.** The ovules then develope into **Seeds,** and the ovary enlarges into the **Fruit** or **Seed Vessel.**

Cross-Fertilization takes place when the pollen of one flower is carried to the stigma of another by some extraneous agency, such as the wind or animal life.

Self-Fertilization occurs when the stigma receives the pollen from the stamens in the same flower-cup as itself. It is not regarded as being as generally beneficial as when cross-fertilization takes place; and to prevent it, flowers are often most ingeniously devised.

The arrangement of the fruit on the stem is naturally the same as that of the flower, and to describe it the same terms are used.

The fruit is in reality the ripened ovary which contains the seeds.

Fleshy Fruits are those in which, as they grow, the ovary becomes fleshy or pulpy. Berries are fleshy fruits.

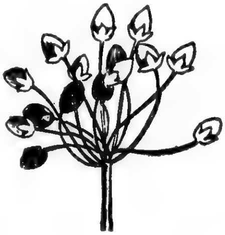


FIG. 53.

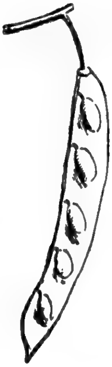
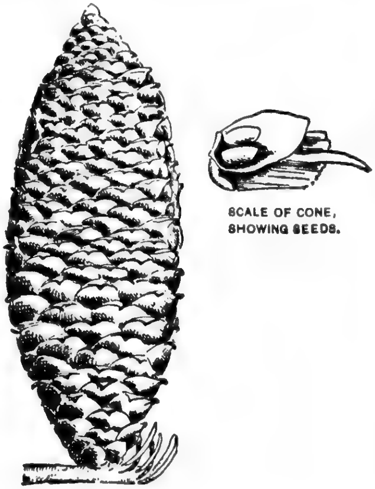


FIG. 54.



SCALE OF CONE, SHOWING SEEDS.

FIG. 55.

A **Pome** is a fleshy fruit. In it the calyx-tube adheres to the ovary and forms of the fruit the greater part. Both in pears and apples, which serve for illustrations, the pods of the core are the only parts of the original pistil.

Stone Fruits are those which are partly fleshy and partly hard.

A **Drupe** is a stone fruit; such as a peach or cherry. In ripening the outer part of the ovary becomes soft like a berry, and the inner part hardens. This formation is the outcome of a special construction of the pistil.

In **Dry Fruits** the seed vessel hardens, remains herbaceous, or it is membranous in texture. The following are those that are commonly found on trees:—

A **Nut** is a dry, usually one-seeded fruit. It is held by an involucre of various forms; such as a cup at the base of the acorn and a burr around the chestnut.

A **Samara** or **Key Fruit** is one-seeded, and is furnished with a membranous wing. (Figs. 51 and 52.)

A **Capsule** or **Pod** is a dry, many-seeded fruit, which bursts open in one piece when ripe and scatters its seeds. (Fig. 53.)

A **Legume** is a simple pod which opens into two pieces. The pea family bear legumes. (Fig. 54.)

A **Strobile** or **Cone** consists of a number of flat bracts, which grow closely and overlap each other forming a head or spike and subtend pistils. (Fig. 55.)

Seeds are the ripened ovules which contain within them the new plant, or the embryo.

They are composed, although found in many different forms, of an outer and inner seed coat and the kernel or nucleus.

The outer coat is frequently hard and shell-like: the inner one is membranous and delicate.

The **Kernel** or **Nucleus** is the part within the coats: the embryo alone, or the embryo and the nourishing matter by which it is surrounded. This latter is called **Endosperm.**

The **Embryo** is the germ, or the rudimentary plantlet within the seed. (Plate I.)

The **Hypocotyl** is the stemlet of the embryo, and from the base of which springs the young root. (Plate I.)

The **Cotyledons** or **Seed Leaves** are the first two leaves of a plant, and are usually completely formed in the embryo. (Plate I.) In accordance with the number of leaves that first grow from the embryo plants are designated as being: **Monocotyledonous,** when there is but one seed-leaf; **Dicotyledonous** when there are two; and **Polycotyledonous** when there are many seed-leaves, as in the pine family. (PLATE IV.)

The **Plumule** is the first little bud that appears at the summit of the hypocotyl and foretells the second growth of leaves. (PLATE I.)

The Growth of the Trees.

BETWEEN the little seed that drops into the ground and the tall tree that springs from it, the difference is great ; and yet, when we know well the seed and have examined its contents, we find that the difference is more one of increased growth than it is of any dissimilarity in character. Within the seed, the tree, in miniature, already lives. As to all things, however, we know there must be a beginning, and although, by simply cutting open sideways the seed of a maple tree, we may with a naked eye see the stem and first two leaves of the future tree all snugly curled up in their seed coat ; with justice we ask how they came to be there and after what manner do they proceed to grow.

It is then necessary for us to go still further back in the story of the tree's growth and to turn our attention to the blossoms of the preceding year. Here we shall find the organs of reproduction, the stamens and pistil ; and so small and hidden are often these most essential parts that their doings can only be successfully followed under a microscope. Carefully placed in the ovary of the pistil is the ovule : the part that is eventually to become the seed. Its nucleus appears to be a mass of pulpy, tissue-like substance and it is enclosed in one or two coats. It is here, within the nucleus that the embryo or seedling is formed, while the coats develop into its seed coat. At the apex of the ovule, it must be noticed, there is a little hole that extends through the coats and which is called the orifice.

Shortly after the blossom has unfolded there appears in the nucleus of the ovule, a small cavity. It is lined with a fine membrane-like tissue, and soon forms a closed sac. At the upper end of the sac and near the orifice is a tiny, round body, something like the smallest bladder imaginable. The sac is the embryo-sac and the small body or cell is the embryo in its primary state.

Now although nature has provided that this little cell should be present its future growth is dependent on whether or no the stigma has received from a stamen the golden dust, or pollen. In fact, it can never become other than what it originally is unless the process of fertilization has taken place. When this is so, however, the tiny grain of powder that alights on the moist surface of the stigma, sends forth from its under side a minute tube. It pierces down through the stigma and style until it reaches the orifice of the ovule, then it enters the embryo-sac and finally touches and quickens the little cell into life. Within this vitalized germ there are usually some tiny grains, a mucilaginous liquid and a pulpy mass, or its nucleus. As we have already seen they are all enclosed in a fine, membranous coat. We have here then a typical cell, as it is generally called, and one that is the ancestor of all the countless millions of similar ones that combine to form the structure of a small plant or the greatest tree. It is simply by the expansion and multiplication of such cells that growth takes place.

After this first cell has enlarged to its limit, it forms a cross partition which divides it into two cohering cells. Soon another one forms a partition and divides into two more cells; and so they continue to increase and to form the hypocotyl of the embryo. It is thus that, encased in its brown seed coat, the miniature tree or embryo is formed and begins to grow. As it does so it draws freely on the nourishing matter that in various forms it finds close at hand.

Dame Nature never forgets, and so well equipped is the embryo that when it touches the soil and begins to germinate, it has but to continue the multiplication of its cells, or as more generally expressed, to increase in cellular tissue; to assume the upright position of a tree and to bear its two first leaves upward to the light and air. At the same time from the bottom

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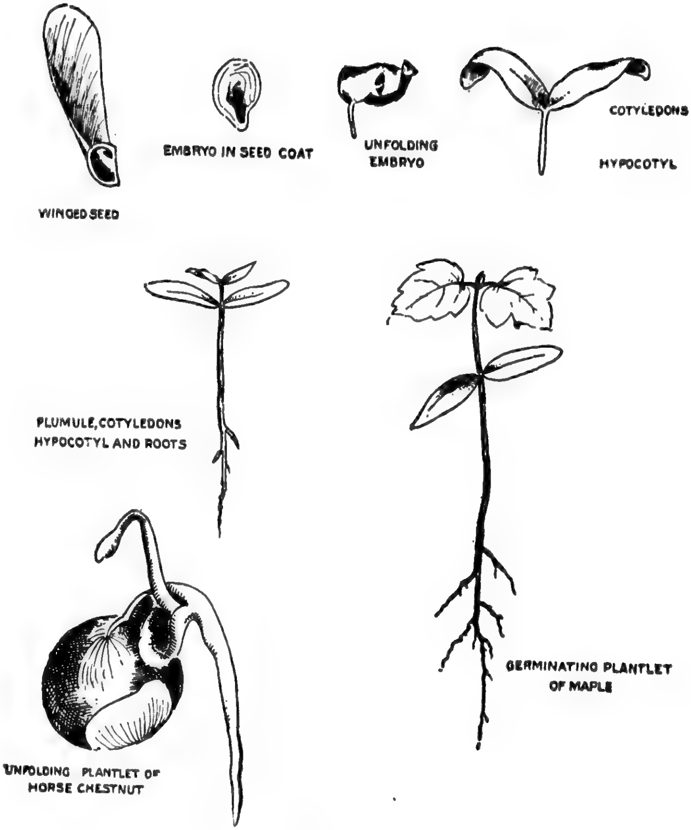
WINGED SEED
EMBRYO IN SEED COAT
UNFOLDING EMBRYO
COTYLEDONS
HYPOCOTYL
PLUMULE, COTYLEDONS HYPOCOTYL AND ROOTS
GERMINATING PLANTLET OF MAPLE
UNFOLDING PLANTLET OF HORSE CHESTNUT

PLATE I.

of its stem the root begins to grow and t a firm hold on the nourishing soil.

This rudimentary plantlet, as has been already said, can be readily seen by cutting open the seeds of a maple tree, it being one accessible to many, and the horse-chestnut seeds also show it in another of its numerous forms. To see something of cell formation, it is only necessary to magnify the young stem or leaves of a plant, or better still the young root ends which, being more transparent, are, for the purpose, admirable.

The growth of the tree, therefore, is in two directions. The stem, or trunk, grows uprightly, elongates and sends forth branches to uphold as large a surface of foliage as possible which drinks in abundantly desired gases from the air and assimilates also the nourishment the roots have absorbed from the soil. The roots in another way seek to lengthen themselves in the pliable soil and assiduously to avoid the light of day.

When the hypocotyl, or little stem of the embryo, has sufficiently grown to bear above the two seed leaves, we notice that it continues to elongate, and that between the cotyledons two tiny buds, or the plumule, appear on this newly formed stem. They foretell the second pair of leaves and we may regard them as having been raised on the stem's second joint. In shape they resemble more closely that of the regular foliage of the tree than do the cotyledons which in outline are always very simple. In some plantlets, even before germination, we find between the cotyledons these little buds or forerunners of the second pair of leaves. (*Plate I.*)

To elongate the stem, therefore, joint by joint, and to unfold the leaves that it bears at the summit is the manner of upward growth ; and it is by this untiring and unchanging repetition of itself that the little plantlet becomes a tree.

The growth of the root is in a different way. At the beginning, as we have seen, the root was a new growth from the base of the hypocotyl ; and so throughout its entire course of existence, it is new growth that proceeds from the extremities.

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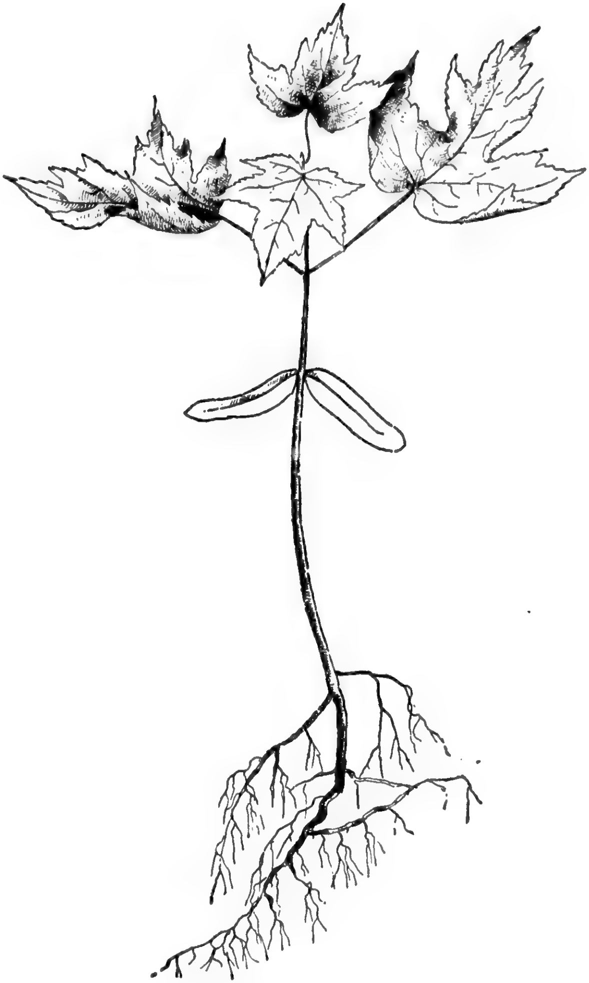

PLATE II. GERMINATING MAPLE.

This fresh, young growth pushes itself through the open soil and freely imbibes nutrition until in its turn it becomes old and stolid and only of use to produce new shoots. The old roots remain firmly in the ground as they at first grew and do not elongate themselves joint by joint as do the stems. This arrangement is simply a very wise conformance to circumstances. With ease and freedom the branches and leaves can move in the atmospheric air that enshrouds them ; but it would sadly interfere with the tenacity of the roots' hold on the soil to be continually changing their position.

As we shall, in this book, confine ourselves to the study of trees and some shrubs, those that have exogenous stems, it would perhaps be well for us to leave for awhile the little plantlet in its upright position with its parts beginning to grow, (*Plate II.*) and to look further into the material of which it is constructed. The soft tissue alone, while being sufficient for mosses and the lower forms of plant-life, would be too yielding to uphold the weight of foliage that is borne by a tree. At a very early stage, therefore, in large embryos, sometimes even while they are in their seed coat, we find traces of wood-fibre. It occurs also in herbs only in a much smaller proportion than in trees or shrubs. These wood cells, or wood fibre, which we find in the wood that surrounds the central pith are very similar in construction to those that form the soft tissue ; only they soon lengthen and harden and thicken their walls. Their tapering ends also usually overlap each other in a way that gives to them additional strength. Again in the wood there are ducts : cells which have grown large and long and join together so as to form channels, or tubes that run lengthwise through the wood. They do not thicken their walls. Instead, the so-called dotted ducts are variously marked, sometimes with thin places, like dots and which become holes as they grow older, while spiral or annual ducts are bound with spirally-coiled fibres, or bands. From the ends of young shoots it is often quite possible to uncoil this filmy thread and in doing so

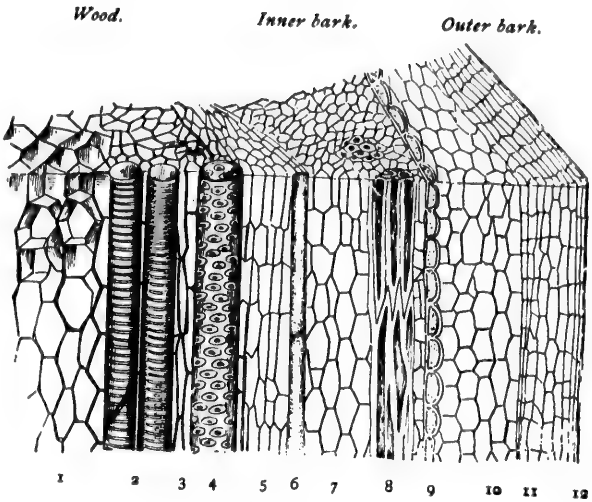

PLATE III.

1. *Central pith.*
2. *Medullary sheath.*
3. *Wood.*
4. *Dotted ducts.*
5. *Cambium layer.*
6. *Sieve tubes.*
7. *Soft bast cells.*
8. *Hard bast cells.*
9. *Vessels.*
10. *Green inner layer.*
11. *Corky layer.*
12. *Epidermis.*

it will be noticed how much it has strengthened the wall of the cell. (*Plate III.*)

Running vertically throughout the wood there is also a set of thin plates of cellular tissue. They are the medullary rays; and it is to them that is owing the beautiful silver grain in many varieties of wood. The feature is one that is easily noticed.

In the liber, the inner bark which covers the wood, the wood cells grow longer and finer than they do in the wood proper. They appear more like fibres and are extremely tough. Bast-cells, or bast-fibres, are the names by which they are known. (*Plate III.*)

The outer bark is made up of soft cellular tissue. In its green or inner layer the cells are soft and delicate and have within them grains of green colouring matter similar to those contained in the leaves. Early in the tree's growth its trunk becomes covered with the outer, or corky layer, a substance the same as our common cork. It is admirably adapted to prevent the evaporation of the ascending fluids,and to it is due the various colourings that we are familiar with in the twigs and branches of different trees. This outer bark, it must be remembered, is finally covered with an epidermis which is also a layer of cells. (*Plate III.*)

Such is the order in which we should find arranged the stem of a young exogenous tree in the first or second season of its growth; and it should now be of interest to us to see how it increases year after year in diameter.

The age of a tree is approximately known by counting its concentric rings of wood; as every year it generally forms only one new layer of wood outside of the old one. The liber also makes an annual growth, but inside of that of the year before, and next to the surface of the new forming wood. These adjoining parts of the stem are the only two that are annually renewed. The process is most interesting. Between the wood and the inner side of the liber there is a layer called the cambium layer which unites the two. (*Plate III.*) It is composed of young and delicate cells. In the spring, a rich sap, something like mucilage in appearance, begins to flow freely and to supply to them abundant nourishment. As they then begin to increase in a manner that has been already mentioned, the inner ones attach themselves to the wood, while the outer ones are added to the liber; and it is in this way that the two annual layers which really renew the life of the trunk are formed.

With the bark it is different: the green layer seldom increases much after the first year of its growth; and although the corky layer often makes from year to year new growth inside of the old, after a time it all dies. It has to contend with the roughness of the elements, and it is especially hurt by being stretched beyond its endurance by the growing wood and liber within. Finally it cracks apart and the rift is patched by the formation of new corky layers. As the outer bark vanishes, the enlarged sheath of bark is thus torn and patched each succeeding year. The outer and older layers of the much mended garment of the tree are constantly falling off and decaying. In old trees the cambium layer and the cells recently formed from it only are alive. Furthermore it is only in the younger wood that sap ascends. As the wood in each annual ring grows older the walls of its cells harden and thicken, and it is no longer regarded as a living part of the tree. It is the heart-wood and, owing to its dryness and hardness, is chosen in preference to the living sap-wood for timber. In different species of trees a colouring matter peculiar to each is deposited in the cells of the heart-wood and it is therefore of various shades. Black in ebony may be cited as an example.

As we have now thought somewhat about the growth of the tree in height and in diameter, we may begin to concern ourselves about its branching; for we shall have little to do with simple-stemmed plants, or those which are known as monocotyledonous, their embryos having but one seed leaf. Our path leads us rather among dicotyledonous trees, which are so called from the fact of their having two cotyledons in the embryo, and among those that have more than two, which is a peculiarity of the pine family. (*Plate IV.*)

We can hardly fail to notice when looking at a young plantlet with what perfect symmetry its leaves are arranged on the stem, and as it continues to grow much of this same order is maintained even should it be become the largest tree. It is not strange then that branches show much of this same symmetry of arrangement; for they follow precisely in the wake of the leaves. Early in the summer, in the axils of the leaves and at their upper sides, we see that buds begin to appear. They are axillary buds, and are the progenitors of branches. When they begin to grow they pursue the same course of development as did the first stem which sprang from the embryo with the little buds between the cotyledons. In the same way they grow, joint upon joint; each one elongating and throwing out leaves at its summit. Other buds are formed in the angles of their leaves and they also become leaf-bearing branches; and so is this simple process repeated while the structure of the tree is building. The only difference between the growth of a branch and that of a germinating plantlet is that the branch is embedded in the larger stem and draws from it its sustenance, while the young stem had to forage for itself and strike out roots into the ground. It sometimes happens that buds begin to grow shortly after they first appear, and again they lie dormant and hidden until the spring of the next year.

Little in the life of the tree is more interesting than the tender care Nature bestows on these young offsprings. Her wisdom is very great; for should the delicate buds be ruthlessly exposed to sudden changes of temperature, or to intense cold, they would assuredly perish, and the next season no branches would be forthcoming. The button-wood and locusts illustrate to us one unique way of guarding leaf-buds from all harm. Apparently the base of the leaf-stalk is swollen; but when it is detached from the stem and examined, it is found to be

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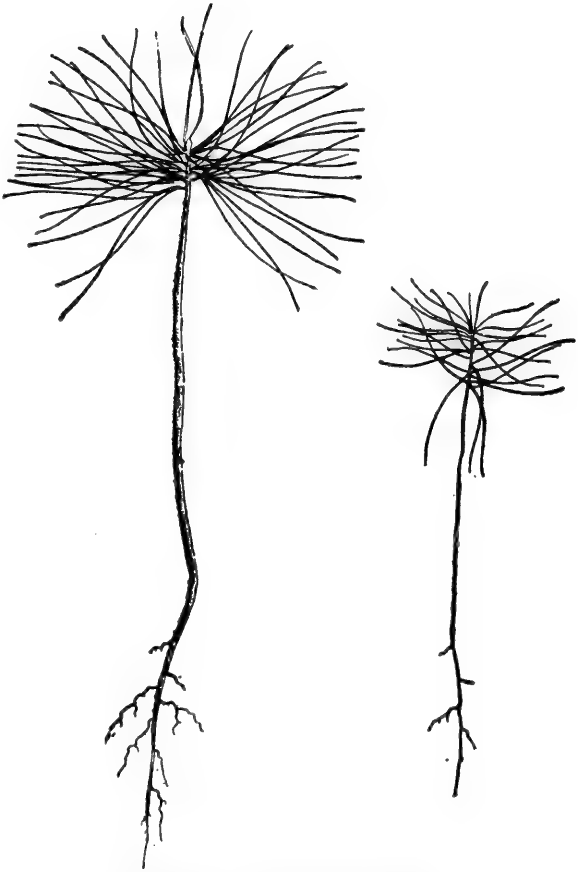
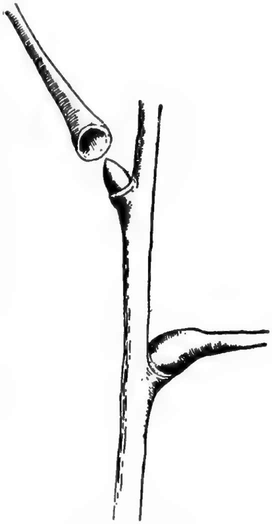


PLATE IV. GERMINATING PINE.

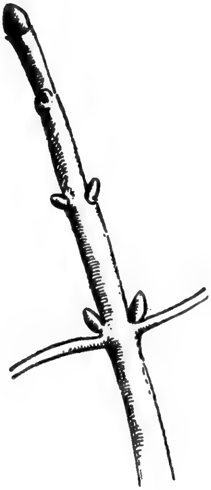
hollow on the inside in the shape of a tiny candle extinguisher; and this is so, simply because it is planned to fit snugly over the leaf-bud that within it lies concealed. (*Plate V.*) Other buds are large and scaly: they are the ones most general in northern climates. Those of the horse-chestnut tree are very handsome. (*Plate V.*) Their scales are large and leaf-like, and so enwrapped about the tender parts within as to effectually protect them from violent changes of temperature. To further abet them in this object they are lined with a soft wool, and on the outside are often covered with a substance similar to varnish. It is quite impregnable to dampness. To open one of these strong buds seems almost like prying into futurity; for there in miniature are to be found several pairs of leaves, and even the buds of the blossoms.

Trees that are not subject to branching, or those of the monocotyledonous division of endogens, rely for their growth on terminal buds. Although branches are borne by the spruces, still their terminal buds are also splendid examples of those that, unless unfortunately destroyed, prolong the main stem throughout the tree's whole course of existence. They ever remain distinct from the branches that proceed from them, and never lose their own identity.

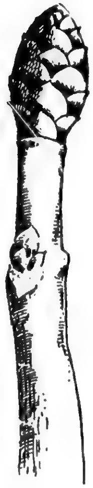
There are trees, however, that bear both terminal and axillary buds: the maples and horse-chestnuts are common examples. (*Plate V.*) In such cases the terminal buds perform the same elongation of the branch as they do in single-stemmed trees, and the axillary buds are also true to their purpose of producing new branches. Usually the terminal buds of these trees are the most vigourous, and next to them the upper axillary buds have the greatest strength. Should, however, misfortune overtake any of these stronger buds, the opportunity would be quickly seized by some weaker one to appropriate its nourishment and to grow. In fact, latent buds lie dormant and sometimes concealed under the bark for years, and patiently await just some such chance to begin their work. Their mission is



Hidden buds of button-wood.



Terminal and axillary buds of maple.



Scaly bud of horsechestnut.

PLATE V.

rather noble. It is to quietly see their stronger rivals flourish until death overtakes them, and then to step calmly in and fill for them their places.

The existence of a young bud, however, is a precarious one. It has many difficulties with which to contend. Often the want of nourishment or light stunts its development; insects devour it, or a belated frost nips it in its early youth. The race is truly one of the survival of the fittest. And how great is the wisdom of this plan is readily seen, for should every leaf-bud be allowed to grow, there would be as many branches the next year as there were leaves the one preceding; and this would of course overburden the tree. Much of the perfect symmetry with which leaves are arranged is therefore lost in the branches. Within the tree, also, there is an instinct of self-preservation which prompts it to produce buds on the wood wherever it has been injured. They are the adventitious buds, and eventually develop into the little lawless twigs which we so commonly see on many trees; the poplars and willows especially.

When a tree makes what is called a definite annual growth, the young shoots of the season burst boldly forth from the buds, in which, it must be remembered, their parts are already formed, and within a few weeks, or perhaps days, attain their whole growth for that year. They then bestir themselves to form and ripen their buds for the next season's similar and rapid growth. Other forms of trees make an indefinite annual growth. Throughout the summer their stems grow without ceasing, until touched perhaps by an early autumn frost. They take no time to form and ripen a terminal bud, and their upper axillary ones are produced so late in the season that they cannot properly mature. The growth of the next year, therefore, is mostly dependent on lower axillary buds which are better equipped. No main stem could possibly be continued in this way, and soon the trunk is broken up into branches, which in the same way divide and sub-divide into innumerable other branches and branchlets. The trunk of the American elm serves as a good example of this system ; and, in fact, all the rounded and spreading tops of trees are the outcome of this mode of growth.

Following these general principles and with many variations in details, trees grow from their seeds and throw out from leaf-buds their branches. It is only by a close observation of them that we can begin to appreciate the fineness of their organism. They leave nothing to chance. Even in the seed we have seen something of their careful advance preparation, and also how when overtaken by it they are equally able to meet misfortune. It is to this wonderful readiness that we owe the sudden and luxurious burst of foliage in the spring. The buds that have been nurtured throughout the winter then await only the soft, warm touch of spring to open and lengthen their joints, that the unfolding leaves may be sufficiently separated from each other. Very little, if any, of the earliest vegetation comes directly from the seed.

Trees are so often regarded simply as masses of foliage that much of the beauty and fragrance of their blossoms is lost by the unobserving. In the earlv spring many of them are laden with exquisite flowers, and all of the trees bloom. Their flowers grow from buds ; and buds that appear at the same places as do leaf-buds. They are always either terminal or axillary, and never occur where a branch might not have occurred. Scientists tell us that the flower is nothing more than a suddenly arrested branch which the plant, to fulfil certain purposes, has so transformed.

When the flower-bud unfolds, its axis does not lengthen as does that of the branch; but it remains almost as short as when in the bud. The leaves then, transformed into sepals and petals, remain closely together, and either are spirally arranged after the manner of leaves, or they alternate in whorls. The stamens of a flower are generally regarded as modified leaves ; and a simple pistil is plainly a leaf with its margins so folded together as to form an enclosure, or the cavity of the ovary. The apex is extended into the style, while the edges of the leaf that remain outward form the stigma. That the flower is a charming device for the purpose of producing fruit and seeds, we know well; and even though it may not always be beautiful there is usually attached to it some peculiar interest.

While the tree is making this visible growth above ground, we must not forget that under the soil its roots are busy branching and extending themselves that they may hold firmly the tree in its upright position, and drain from the soil more nourishment to supply its increased growth. The simple root that first grows downward from the end of the embryo remains, in many instances, for a long time the main root, (*Plate VI.*) and from it sends off side branches; more often, however, it soon divides up into branches that in their turn again branch. As has been mentioned, it is the fresh young roots that absorb the nourishment from the soil. To aid them in so doing their surfaces are sometimes closely covered with root hairs. These are simply elongations of the surface, or cells that are projected, and their thin coverings allow them greedily to imbibe moisture into their tube-like interiors. It is from these well-supplied young roots that the sap is drawn up to feed the leaves and growing parts of the tree.

This upward rise of the sap from the roots to the leaves is a subject of much interest. It takes place principally through the wood cells. And yet each one of these cells is a closed and separate cavity; they in no way open into each other as is generally supposed. By what means, then, we may ask, does the sap pass through them. It is possible for it to do so because, although there are no holes in the young cells, there are thin places in their thick walls; and the passage through is further facilitated by the thin place in one cell connecting with the thin place in the wall of the adjoining cell. That the leaves are able to draw the contents of these cells up to them from the roots, while seemingly most wonderful is by a natural law.

We find that, whenever two fluids of different degrees of density are separated from each other by a membranous partition,

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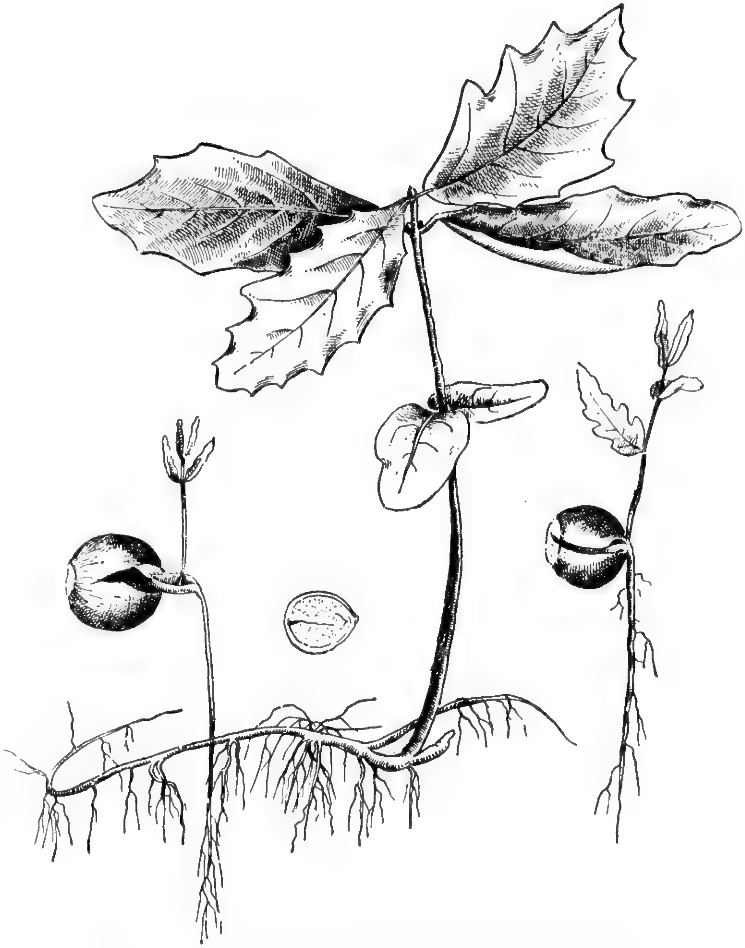

PLATE VI. GERMINATING OAK, SHOWING MAIN ROOT.

the heavier fluid will attract to itself the lighter one until they both become of the same degree of density. In the cells of the young roots there is living organic matter, mucilage and protoplasm, and the fluid is naturally denser than the liquid they attract from the soil. The flow is, therefore, necessarily into them. The leaves, however, throw off into the air as vapours a vast amount of the water they contain; especially is this demand made in dry weather. In fact, they exhale more freely than any other part of the tree. The organic matter which then remains in them is, as will be readily seen, more dense than that of the stalks which have not given out their moisture so freely. The leaves, therefore, call on the stalks for an upward flow of the contents of their cells. In the same way the stalks call on the stems, and so on is the demand made until the watery fluid of the root-ends is reached and drawn upward to the leaves, or buds or any growing part of the tree.

After the sap has been assimilated by these parts growth begins, and in their own mysterious way they shape themselves. Later the sap flows downward through the cambium layer, and is again sent to parts where the tree needs it most.

The assimilation of the crude sap is done in the green part of the tree, and only is it accomplished when the brightest daylight or the rays of the sun are shining upon them. New tissue is then building, while useless matter is ejected. The transpiratory organs of the leaves, innumerable minute openings called stomata, are on their under surfaces. They open and close. Then, too, the carbonic acid gas and water that the tree has absorbed from the earth and air are digested and given out abundantly as oxygen gas. This is finally the g purpose of the vegetable world; to convert inorganic matter into that which is organic, or to produce the food that is necessary for all animal life.

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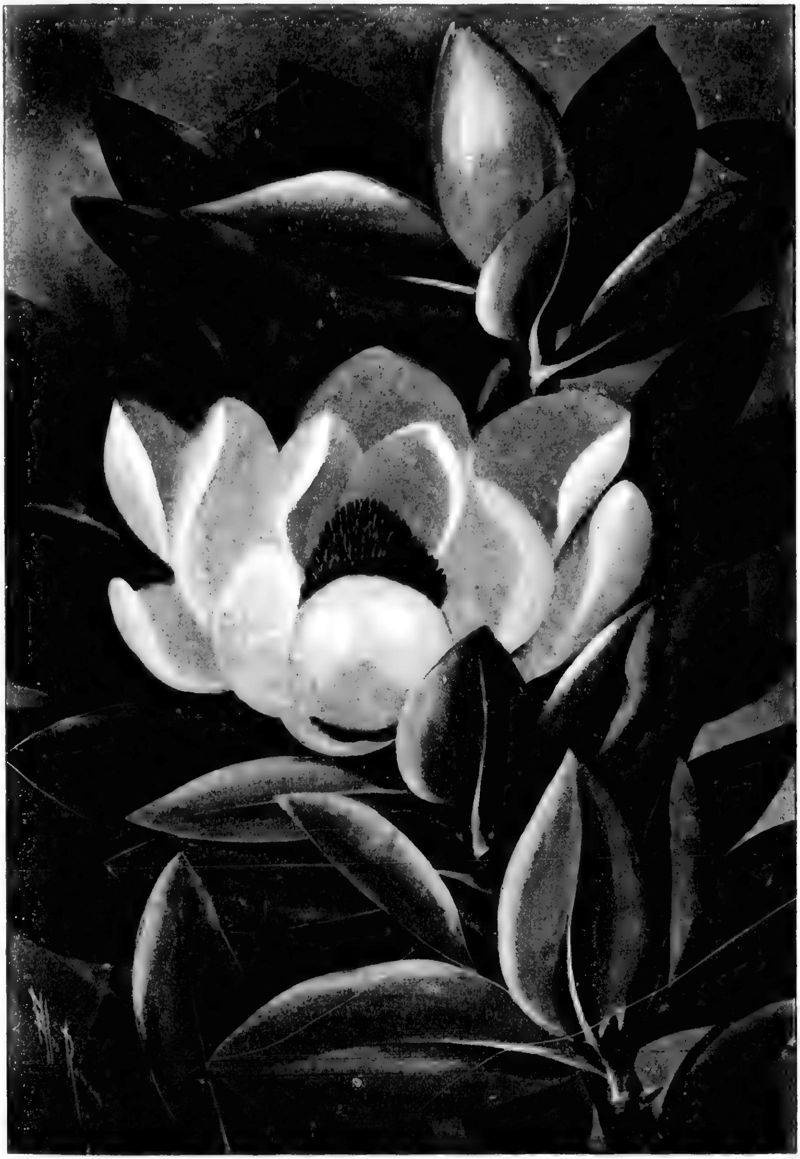

PLATE VII. GREAT-FLOWERED MAGNOLIA. *Magnolia fœtida.*

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Trees Preferring to Grow Near Water: in Swamps and by Running Streams.

Obscurity can never hang over the swamps nor can the trail of a stream be hidden; for guarding their borders are the trees, heavily laden perhaps with the moisture they have imbibed from the near water. They ceaselessly stir in the breezes and throw into the air their life-giving vapours and sweetness. Under their shade the wild, vagrant flowers live and die. They gild the stream's borders with gold and line the swamps with crimson. When dimness touches them, the trees bestir themselves to carry the flower's seeds away, or they toss them in the water which floats them to another shore.

Do the trees know the flowers will come again; and does hope still whisper to them when their own leaves have fallen and the mirthful water is frozen to stillness?

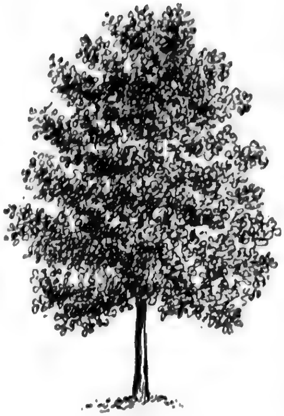
GREAT-FLOWERED MAGNOLIA. BULL BAY. (*Plate VII.*)

Magnòlia fœtida.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Magnolia.	*Round-topped.*	60-80 *feet.*	*North Carolina southward and westward.*	*April, June.* *August, northward.*

Lower bark: brownish grey, with appressed scales about one inch in length. *Branches:* lighter in colour, thin, smooth. *Leaves:* simple; alternate; entire; with stout petioles; ovate, five to eight inches long and two to three inches broad; evergreen; thick; bright green above and shiny. The winter buds and petioles covered on the under side with a rusty looking tomentum. *Flowers:* cream-white; very fragrant; seven, eight or twelve inches in diameter; solitary and terminal at the ends of the branches. *Sepals:* petal-like. *Petals:* six, nine or twelve; oval; concave. Base of the receptacle and lower parts of the filaments bright purple. *Fruit:* large; ovate; rusty brown; pubescent; of many pods. *Seeds:* flattened on one side; slightly triangular; when released from the pods they hang by threads.

When this tree, so severe and simple in the outline of its



Magnolia fœtida.

shining foliage, throws out its blossoms, it appears almost as though a great flock of something white and unearthly had alighted among its branches. And as they lean upon the warm, sunny air they exhale a perfume that is no less mystifying. At least, some lasting impression must cling to those that see it in bloom for the first time. To others, however, that have from childhood walked in the southern streets and gardens shaded by these trees, it is simply said : "the magnolias are in bloom." It quite suffices. Undoubtedly the tree is the most beautiful and ornamental one of America and it is to be regretted that while evergreen in the south it is only precariously hardy as far northward as Philadelphia. It then blooms as late in the season as early August. As it leaves the coast and travels inland, it seeks for its home the seclusion of the forests instead of the banks of rivers and swamps. On the bluffs of the Mississippi it is also found in a state of splendid development.

Rose-beetles seek the flowers just as they are beginning to open and are frequently held prisoners beneath the three inner petals which vault over the stigmas. Here they find, in the early days of spring, a warm and fragrant shelter, and the honey that lies on the stigmas provides for them a continuous feast. When the sepals and petals fall they fly away, laden with pollen in search of another abode ; and so they regularly accomplish the fertilization of the tree. Self-fertilization is prevented from the fact that the stigmas mature before the anthers.

The wood of the great-flowered magnolia is more valuable than that of any other one of the genus. It is of a strong and

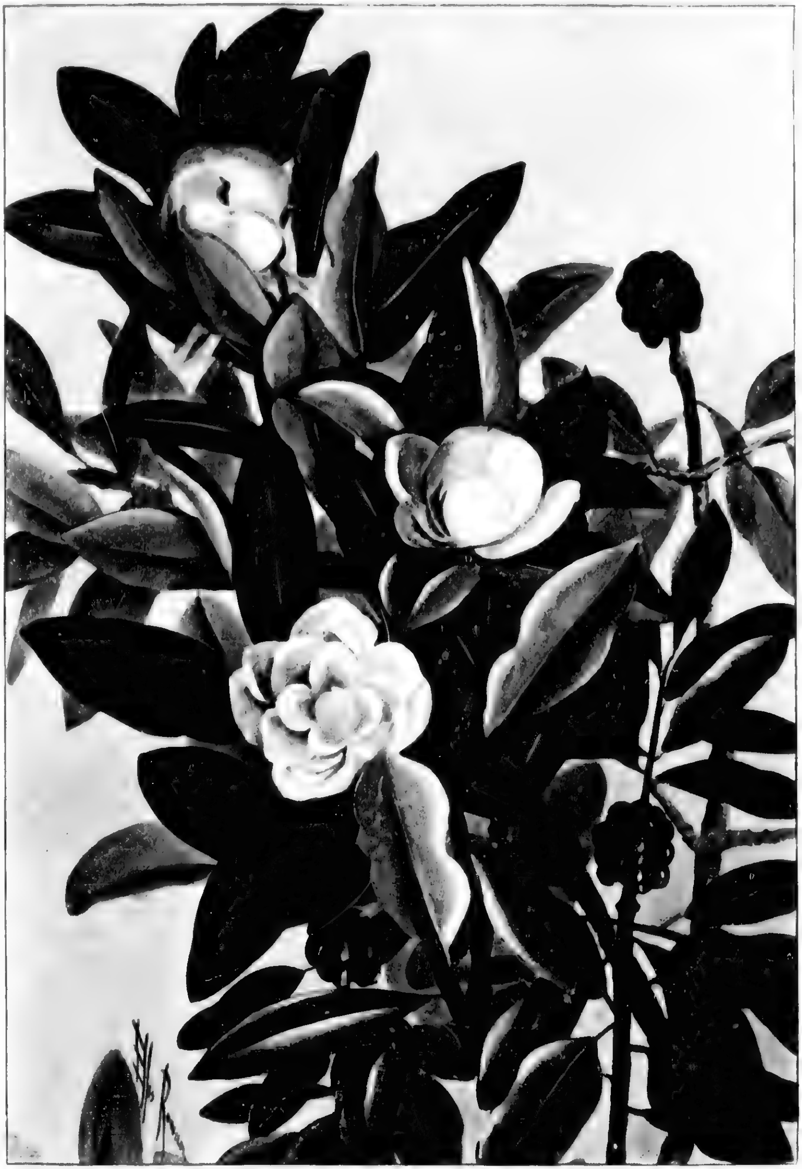


PLATE VIII. SMALL MAGNOLIA. *Magnolia Virginiana.*

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fibrous nature. Although it is mostly used for fuel it is quite worthy of a place in cabinet work. As is true of all the magnolias, the juice of the tree is intensely bitter and aromatic. It has been used as a tonic.

It is interesting to reflect that the beautiful Council-tree at Charleston, South Carolina, was a magnolia. According to tradition it was under its shade that on the twenty-first of April, 1780, General Lincoln held a council with his officers and many citizens of Charleston as to the advisability of retreating before the British. The decision was in the negative and three weeks later the city was surrendered. Until 1849 the magnolia was held in especial veneration by the inhabitants of Charleston. At that time its branches spread themselves over a space of more than two hundred square feet. It had then unfortunately passed into the possession of one who, being devoid of all sentiment, ruthlessly chopped it down for fire-wood.

SMALL MAGNOLIA. SWEET BAY. LAUREL MAGNOLIA. SWAMP SASSAFRAS. (*Plate VIII.*)

Magnòlia Virginiàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Magnolia.	*Slender.*	50-70 *feet.*	*Eastern Mass. southward to Florida, westward to Texas.*	*May-August.*

Bark: light brown or greyish, covered with thin appressed scales. *Branchlets:* bright green the first year, becoming reddish brown with age. *Leaves:* simple; alternate; entire; obovate; pointed, with distinct midrib; thick; dark green above and shiny, downy and whitish underneath. *Flowers:* white; fragrant; two to three inches in diameter; solitary and terminal at the ends of the branches. *Calyx:* of three sepals on the receptacle. *Corolla:* broader than high; of six to nine rounded petals. *Stamens:* numerous. *Pistils:* numerous; arranged in the shape of a cone. *Fruit:* cone-like; red, each pod with one or two scarlet seeds.

It is only in the north that this exquisite tree is reduced to the condition of a shrub of from about four to twenty feet high. Its bloom, however, is quite as waxen and fragrant as when borne on the more stately tree of the south. Another

Magnòlia Virginiàna.

difference which is owing to their locality is that in the north as soon as the leaves are touched by the early frost of November they fall to the ground, while in the south they remain on the tree to welcome the new and unsophisticated ones of the next year. Magnolia Virginiana is one of the very lovely features of the deep New Jersey swamps. Its wood is soft and of no great value, although throughout the southern states it is sometimes used for the making of small wooden utensils and broom handles.

SOUR GUM. BLACK GUM. TUPELO. PEPPERRIDGE.

(*Plate IX.*)

Nýssa sylvática.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Dogwood.	*Branches, horizontal.*	30-50 *feet.*	*Southern Maine to Michigan and southward to Florida.*	*April-June.*

Bark: grey; rough; much broken in small pieces. *Leaves:* simple; alternate; entire; with short petioles which are downy when young; elliptical; dark green above, lighter below; thick; the midrib slightly pubescent when young. *Flowers:* greenish; clustered at the end of an axillary peduncle. *Staminate flowers:* small; numerous. *Pistillate flowers:* from three to fourteen and larger. *Fruit:* dark blue or nearly black; about one half an inch long and enclosing an ovoid and slightly ridged stone; acrid to the taste until touched by the frost.

Although the sour gum tree is of frequent occurrence in the north, it seems to be much better known and loved throughout the south. It is there incidental in many amusing stories and anecdotes. In the north the tree is frequently mistaken for a beech as their spray and foliage are somewhat similar. Quite as early as August its leaves begin to turn a brilliant crimson which almost rivals that of the scarlet maple. The negroes of the south regard the tree with very tender affection

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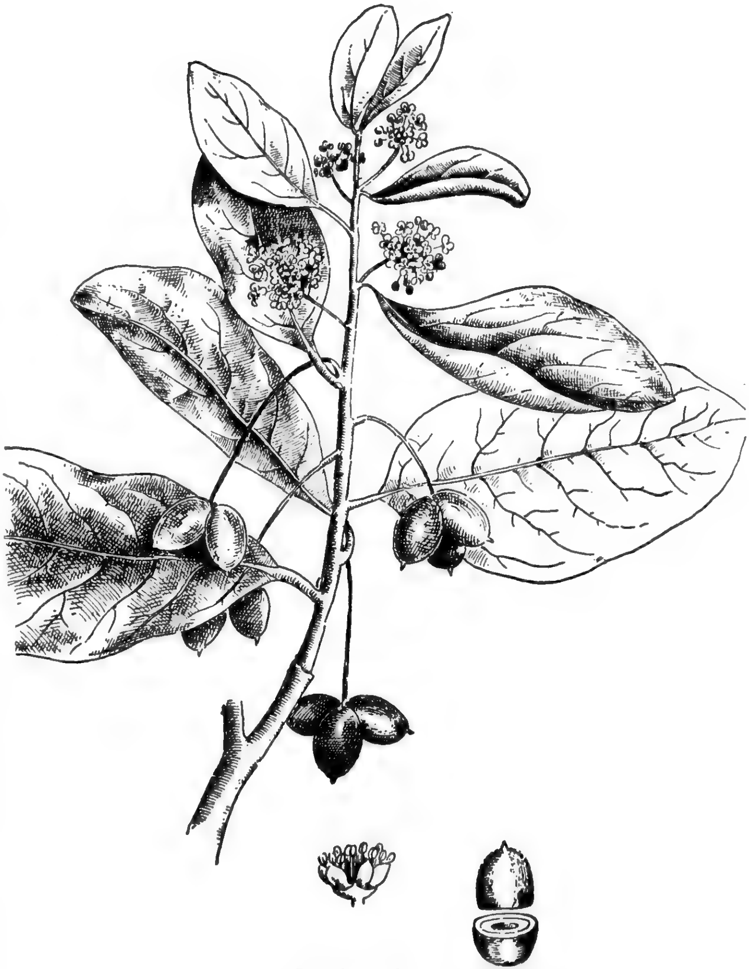

Staminate flower. *Fruit.*

PLATE IX. SOUR GUM. *Nyssa sylvatica.*

and that the opossums climb it in search of its fruit is not unknown to them.

> De possum thought he kno' de world
>   And he climb de old gum tree;
> He neber saw what I can do
>   When my surest gun's with me.

In connection with the old plantation days of the south a story is told of the gum tree. Its wood is very hard and does not split readily, and it was therefore thought desirable on Christmas day to use one of its largest trunks as the back log of a great fire that was kindled on the hearth. As long as it burned no work was required to be done on the plantation. The negroes knew this custom and as soon as the sap had ceased to flow downward in the autumn they would cut a tree and sink it in the river bed. There it peacefully remained and absorbed water; and they forgot its existence until shortly before Christmas. With much trepidation it was then taken up and presented as the one chosen to be the back log. In its saturated condition it naturally burned, when once ignited by the immense heat of the fire, for a long time. It sometimes smouldered for weeks; and we may imagine with what innocent wonder it was watched by those enjoying the holiday.

In Virginia the light yellow wood of the gum tree is used in ship building; but as a rule it is not adapted to purposes where long lengths are needed. It is admirable for the making of pulleys and the hubs of wheels.

Nýssa biflòra.

Nýssa biflòra, or water tupelo, (*Plate X.*) is a very similar tree to the preceding species and was formerly regarded as a mere variety. Its foliage and fruit are smaller and the stone that the drupe encloses is flattened and much more ridged than not

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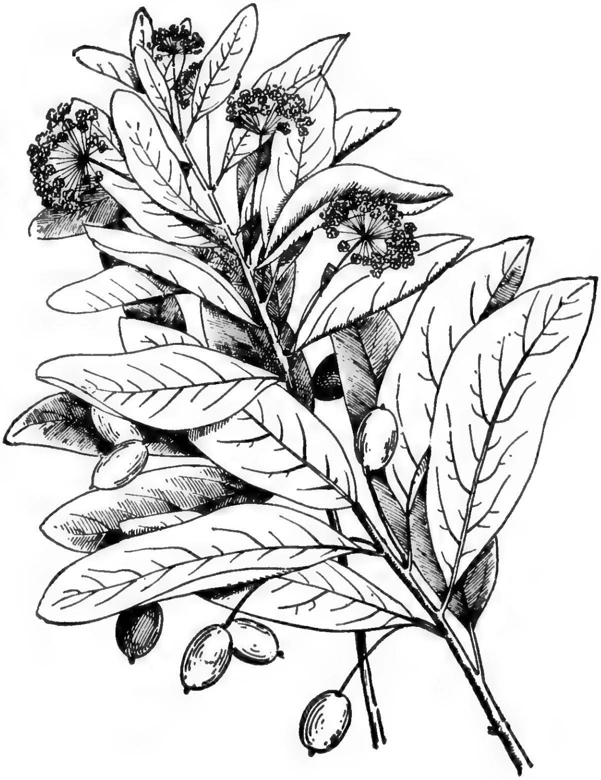

Pistillate flower.

Fruit.

PLATE X. WATER TUPELO. *Nyssa biflora.*

that of Nyssa sylvatica. Both are picturesque trees, especially in the autumn when their brilliant foliage blazes from the river's bank and they are hung with their dark blue fruit.

BLACK ALDER. VIRGINIA WINTERBERRY. (*Plate XI.*)

Ìlex verticillàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Holly.	*Bushy, spreading.*	6-25 *feet.*	*Nova Scotia, westward, and to Florida.*	*May, June.* *Fruit: Sept., Oct.*

A tall shrub. *Branchlets:* greyish, glabrous or pubescent. *Leaves:* about two inches long; simple; alternate; with short petioles; obovate or broadly lanceolate; usually pointed at both ends; coarsely serrate; dark green above and glabrous; paler below and pubescent; thick, not very shiny. *Flowers:* white; six to eight parted; clustered thickly in the axils. *Drupes:* brilliant red and appearing verticillate in manner of growth.

In what is called the dreary season of the year, long after the time when its leaves have turned black and fallen, there is something particularly enchanting about this coarse shrub. Standing out amid the misty greyness that prevails and against perhaps the rich brown glow of some distant wood its lively coloured berries give a touch of hopefulness to the landscape. In fact the brightness of the twigs of various shrubs adds gleams of colour to a winter scene that are not dreamt of by the unobserving.

In early summer its blossoms shine clear and bright, but they are modest, retiring little things and do not claim the same attention as do the berries. They unfold with those of the common elder, its relative the withe-rod or viburum nudum and the lovely small magnolia. By them the swamps and low grounds are made gay.

WILD YELLOW PLUM. WILD RED PLUM. CANADA PLUM. (*Plate XII.*)

Prùnus Americàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Plum.	*Slender, spreading.*	8-35 *feet.*	*Canada southward to Florida and westward to Colorado.*	*April, May,* *Fruit: Aug.,-Oct.*

Bark: bronze-green; smooth; thick. *Branches:* thorny. *Leaves:* simple; alternate; with smooth, reddish petioles; oval or obovate, with pointed

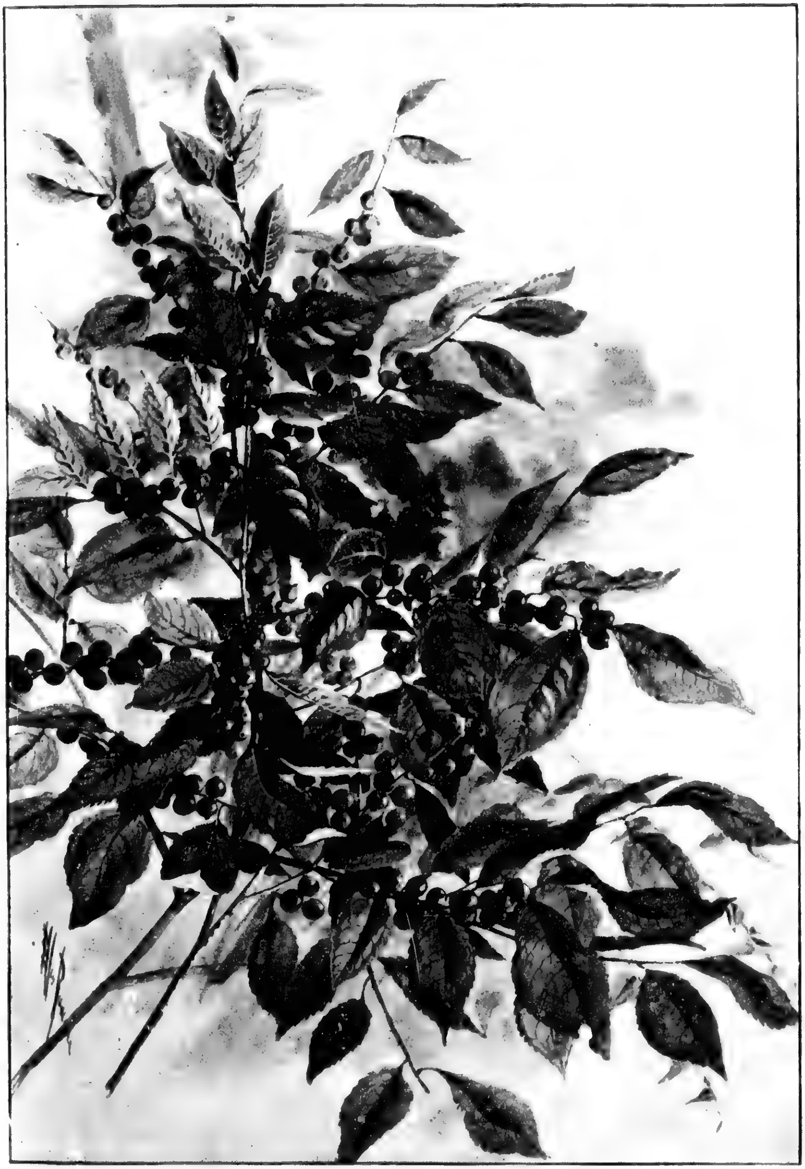

PLATE XI. BLACK ALDER. *Ilex verticillata.*

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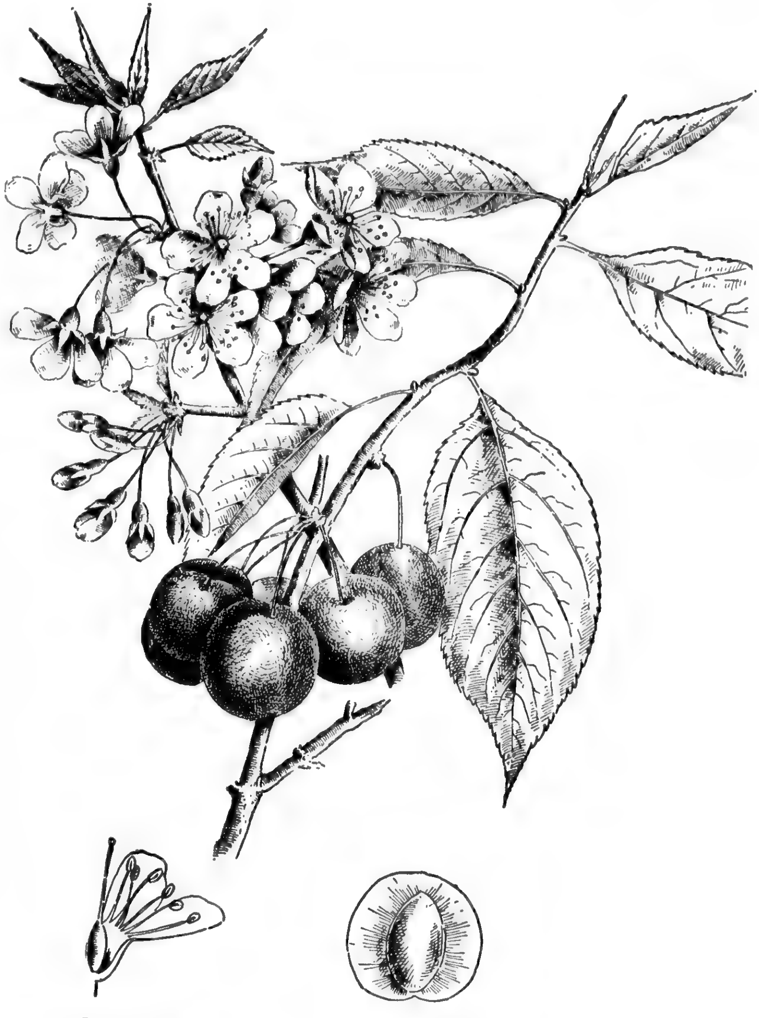

Section of flower. *Fruit, laid open.*

PLATE XII. WILD YELLOW PLUM. *Prunus Americana.*

apex and pointed or rounded base; thin; netted-veined; sharply and doubly or singly serrate; pubescent beneath in the angles of ribs and becoming smooth at maturity. *Flowers:* white; growing in umbel-like clusters from separate lateral buds and usually preceding the leaves. *Fruit:* a dull orange or crimson drupe; round and containing a flattened stone with sharply winged edges; glabrous; edible with a pleasant flavour. The skin acrid and tough.

Prùnus Americàna.

As the specific name of this tree implies it is a native of America. In its wild state it grows along the borders of streams and sometimes seeks the shelter of a light strip of woodland. Occasionally it is planted; but it is much better to use it as a stock upon which to graft some one of the domestic species of plums. For this purpose its hardiness and other good qualities make it suitable and many excellent results have thus been obtained. The chief charm of the tree is the colour of its ripe fruit. There is an almost transparent brightness about it which in effect is most artistic. At the season of its ripening housewives were formerly very much on the alert when they sought the fruit and made it into preserves.

CHOKE CHERRY. (*Plate CXLVI.*)

Prùnus Virginiàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Plum.	*Bushy, spreading.*	2-15 *feet.*	*New England southward to Georgia and westward to Colorado.*	*April, May.* *Fruit: July, Aug.*

Bark: dark grey. *Leaves:* simple; alternate; oval; pointed; finely and sharply serrate; thin. *Flowers:* white; growing compactly in a short, close raceme. *Calyx:* tubular; bell-shaped; five-lobed. *Corolla:* with five very small petals. *Stamens:* numerous. *Pistil:* one. *Fruit:* A bright red cherry which turns later to dark crimson. The stone and kernel are flavoured with and contain prussic acid.

By the side of the streams and rivers and often along roadsides and thickets from April until late in August the attention of the passer by is caught by either the bloom or the fruit of the choke-cherry. It is always a shrub, and has a sprightly, refreshing aspect. Little birds are seen alighting, for a moment,

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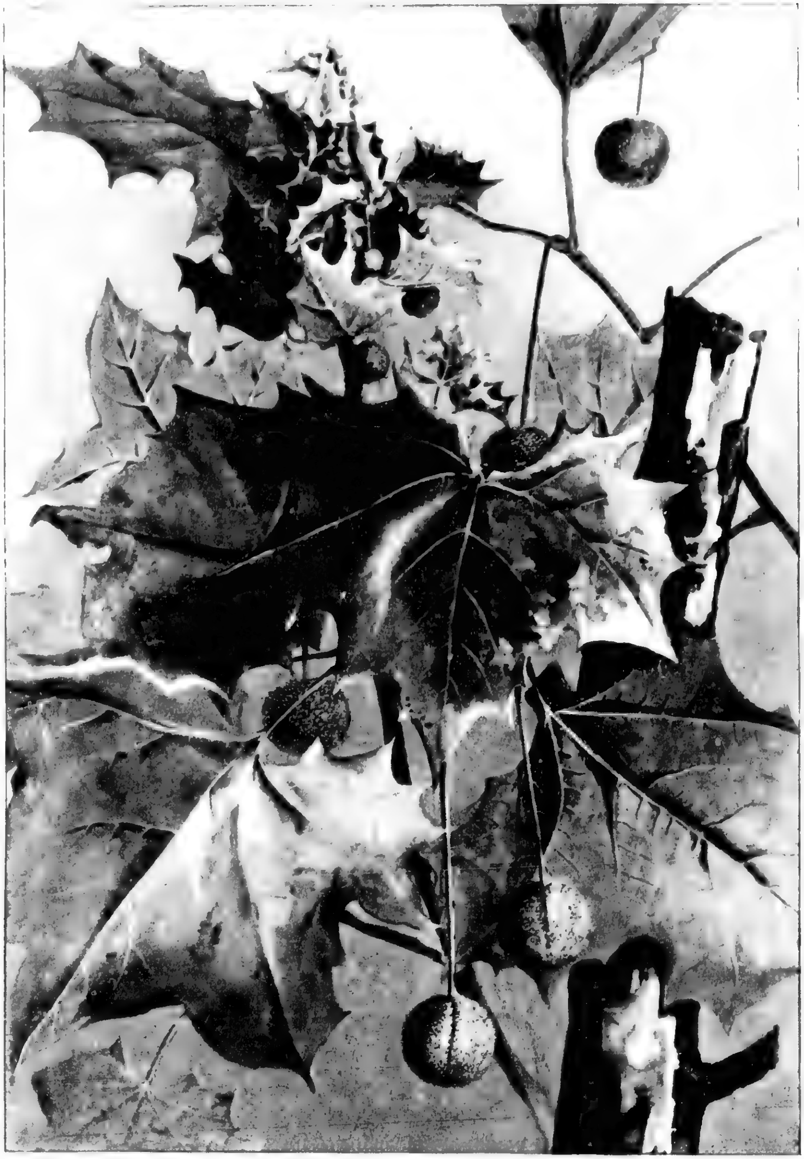

PLATE XIII. BUTTONWOOD *Platanus occidentalis.*

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on its branches and then darting in and out as though encouraging it not to lose a gleam of sunshine or the softest murmur from the stream. The long, cylindrical bunches of fleecy blossoms are very pretty, but they quite pale before the exquisite fruit which shows many shades of colour before settling down to the dark crimson or, rarely, yellow of ripeness. It provides, in fact, a much better feast for the eye than it does for the palate, and although the experience of tasting is not harmful, it is one that is not apt to be soon repeated.

BUTTON-WOOD. PLANE-TREE. BUTTON-BALL TREE.

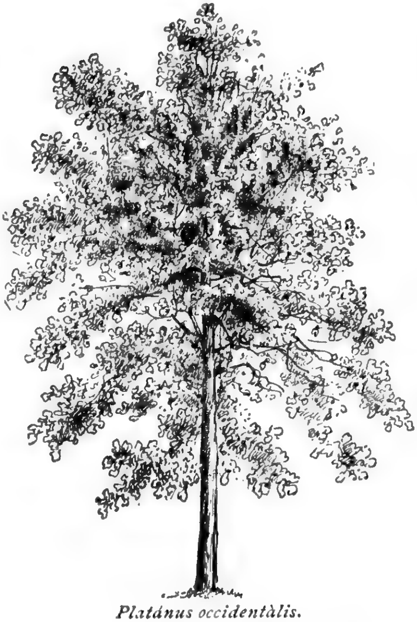
(*Plate XIII.*)

Platánus occidentális.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Plane-tree.	*Wide spreading, broad.*	60-190 *feet, or higher.*	*Southern Maine southward and westward.*	*May.*

Outer bark: dark brown; thin; peeling off freely and showing the silver white and polished inner bark; often presenting a mottled appearance. *Leaf-buds:* axillary and concealed throughout the summer and winter under the hollow base of the leaf petioles and being thus protected until the next spring. *Stipules:* like sheaths. *Leaves:* simple; alternate; with downy petioles; orbicular, with taper-pointed apex and squared or cordate base. The edge coarsely toothed or often three to five-lobed; the sinuses between them rounded. The leaves and petioles become smooth at maturity. *Flowers:* small, in round heads; monœcious. *Fruit:* growing closely in solitary round balls which hang from the ends of lony wiry peduncles. They become dry and remain on the branches until well on into the winter, or until their seeds are scattered by the wind.

About this striking tree there is an almost matchless dignity, and its bearing, so different from that of any other, has caused it to be very generally known. On all sides we hear it said, "that is a sycamore." Unfortunately this name is, although in error, most commonly used. We should, however, accustom ourselves to calling it by another of its English names. The tree at times grows to a height unrivalled by any of the Northeastern American forests, and it lives to be very old. An unusual feature about it is the way in which the outer bark peels off as the season advances and displays the polished inner bark. As it then raises these white almost spotless branches upward, it seems as though the tree in mute elo-



Platánus occidentàlis.

quence proclaims that it has suffered all things. It has braved the fierceness of tempests and watched the struggling of many generations. But it is not dismayed; and when, especially in the moonlight, its shimmering branches are seen towering above other things they testify that it has triumphed. It is most pathetic to see the tree when it has at last succumbed and is about to die. Stripped of its foliage and its swinging balls of fruit, it appears a gaunt figure upon the landscape.

The wood is reddish brown and has a most beautiful grain. It is used for the interior finish of houses although it is quite prone to crack. The beautiful tree is also largely made into tobacco boxes.

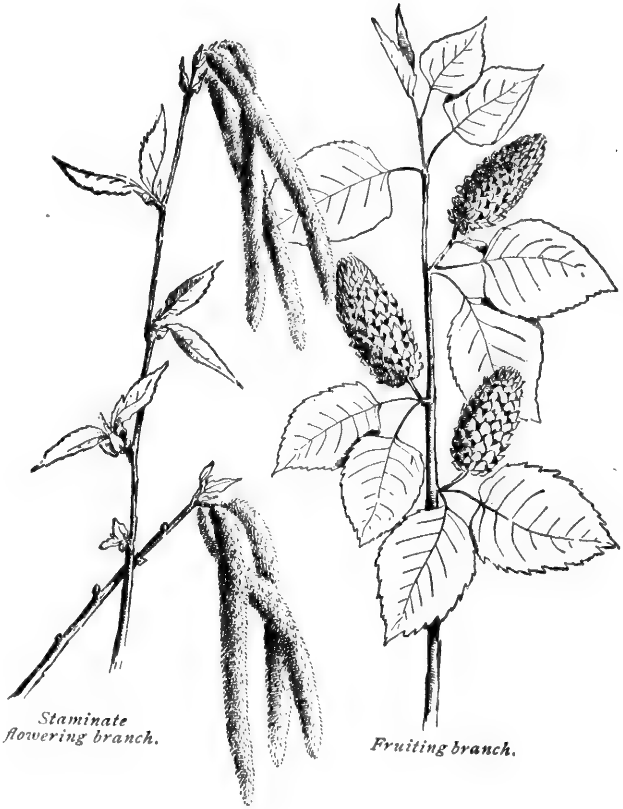
Ficus Sycomorus, sycamore, the tree to which the name is properly applied, is a native of Egypt and Syria. It is of medium size, very bushy and is closely allied to the fig tree. Its fruit is much eaten, and at one time its wood was used for the coffins of mummies.

RIVER BIRCH. RED BIRCH. (*Plate XIV.*)

Bétula nìgra.

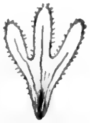
FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Slender, drooping.*	30-60 *feet.*	*Mass. southward and westward to Minn.*	*April, May.*

Bark: reddish brown; dotted and peeling, not as the white birches but becoming loose and hanging in thin light brown sheets. *Leaves:* simple; alternate; often two together; with short and pubescent petioles; ovate, fre-



Staminate flowering branch.

Fruiting branch.



Scale of cone.

PLATE XIV. RIVER BIRCH. *Betula nigra.*

quently pointed at both ends; unequally and rather doubly serrate with entire base; green above, whitish and pubescent underneath. *Flowers:* growing in long, downy catkins. *Fruit:* very small; broadly-winged; pubescent at the base.

Not until it reaches the lower part of New York is this birch very commonly seen, and from there it travels southward as though in search of a still warmer climate. None other of the birches is found in the south, and therefore it seems strange that this one should reach its best development south of Baltimore. The tree is very graceful, and when seen along the banks of rivers and lakes its drooping branches appear as though they were longing to stretch down and drink of the cool water. They sometimes hang nearly to the ground. In the autumn its foliage turns a bright yellow. This is the birch from the twigs of which are made brooms.

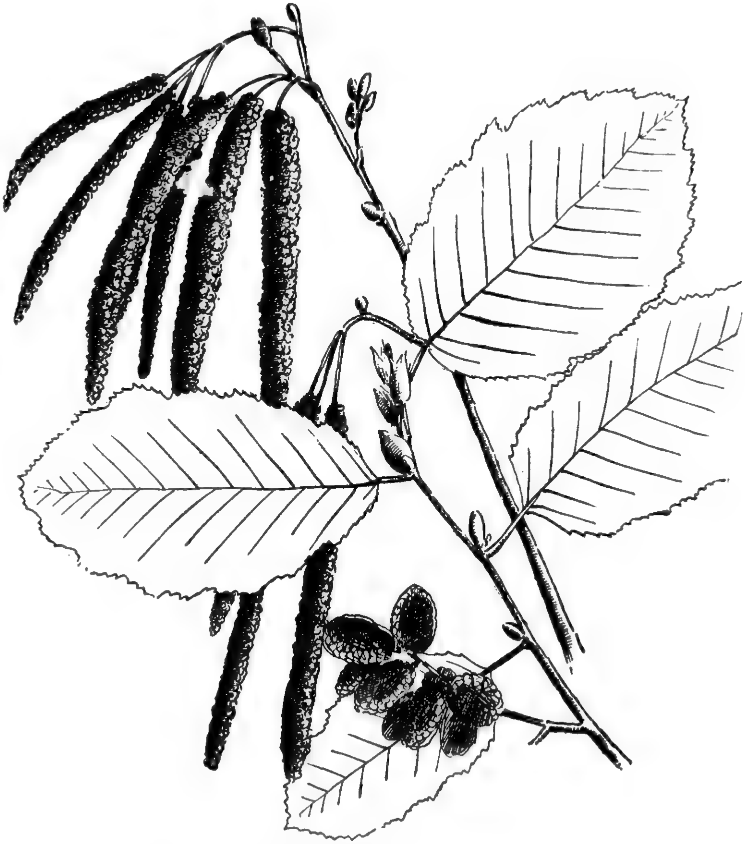
SPECKLED ALDER. HOARY ALDER.

Álnus incána.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Bushy, spreading.*	8-20 *feet.*	*Pennsylvania northward.*	*April.*

Bark: green; shiny. *Twigs:* glabrous. *Leaves:* simple; alternate; with short petioles; broadly ovate, pointed at the apex and squared or rounded at the base; irregularly and finely serrate or sometimes coarsely toothed; the veins brownish and prominent on the under side; pale dull green above, whitish and very downy below; with age becoming smoother. *Flowers:* reddish brown; growing in catkins from naked buds and appearing some time before the leaves. Staminate catkins about three inches long; pistillate ones thick and shorter. *Nut:* orbicular.

How eager the alders are to greet the spring. It seems as though they could hardly wait for the winter to be gone. When there is not a flower astir and the air is still full of the scent of dried leaves, they and the white maples begin to bloom. A point of interest about their pretty catkins is that while they are formed one summer they do not develop until the next season. Throughout the winter they have remained naked on the trees. In earliest spring therefore they are quite ready with their seeds and toss them about in the spirit of unconcern



Flowering branch.

PLATE XV. SMOOTH ALDER. *Alnus rugosa.*

and lavishness which it sometimes pleases Nature to display. They are then picked up by the wind or carried along with the stream until they find some fitting niche to rest in, and to grow. The quaint little cones are often seen in the autumn hanging on the branches together with the young catkins. Although usually a shrub, the speckled alder sometimes becomes a small tree.

A. rugòsa, smooth alder, (*Plate XV.*) is also a shrub or small tree which ranges in height from five to twenty-five or forty feet high. That its obovate leaves are green and rather smooth on both sides will serve as a means to distinguish it from Alnus incana. Its young twigs are also slightly pubescent. Its favorite home is along the borders of streams where it forms close thickets. It is found also on moist hillsides.

AMERICAN HORNBEAM. WATER BEECH. BLUE BEECH. IRONWOOD. (*Plate XVI.*)

Carpìnus Caroliniàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Head open; branches spreading.*	10-40 *feet, higher southward.*	*New Brunswick to Minnesota, southward to Florida and Texas.*	*April, May. Fruit: Aug., Sept.*

Trunk and *branches:* ridged. *Bark:* smooth; greyish black, and irregularly and vertically lined with stripes of dull grey. *Branchlets:* slender; when young, brownish purple, terminating in green-bronze; those that are older, with an ashy hue. *Leaves:* simple; alternate; with short, slender petioles; ovate-lanceolate, or oblong, with pointed apex and rounded or slightly cordate base; sharply and unevenly serrate; ribs straight; pubescent; especially so in their angles; above smooth. *Fruit:* growing in a green, elongated, drooping cluster. The small nuts growing singly at the base of two opposite, halberd-shaped, three-lobed bracts.

This enchanting little tree or shrub is sometimes found growing in a one-sided fashion which allows its branches to droop over a stream. As they do so the flower or fruit clusters hang at right angles to the boughs; so they are thrown into prominence and give a light effect to the foliage. The bracts of the clusters are much more strongly tinted with yellow than are the dark green leaves. A young spray of the tree is very beauti-

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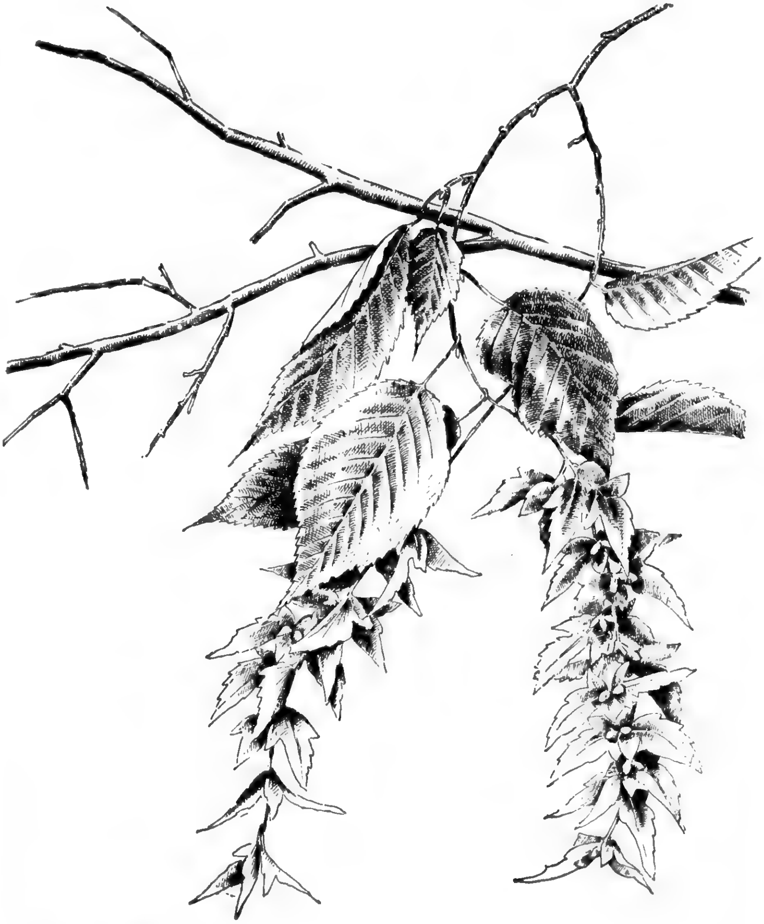
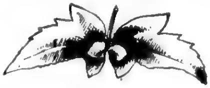




Nuts and bracts.

PLATE XVI. AMERICAN HORNBEAM. *Carpinus Caroliniana.*

ful, and we may fancy it would make a bewitching decoration for the white, fleecy gown of some woodland fairy.

The tree is slow of growth, and as the name ironwood implies, its wood is very strong and compact. It is well adapted to the making of farming implements, such as the teeth in rakes and other similar articles where durability is required.

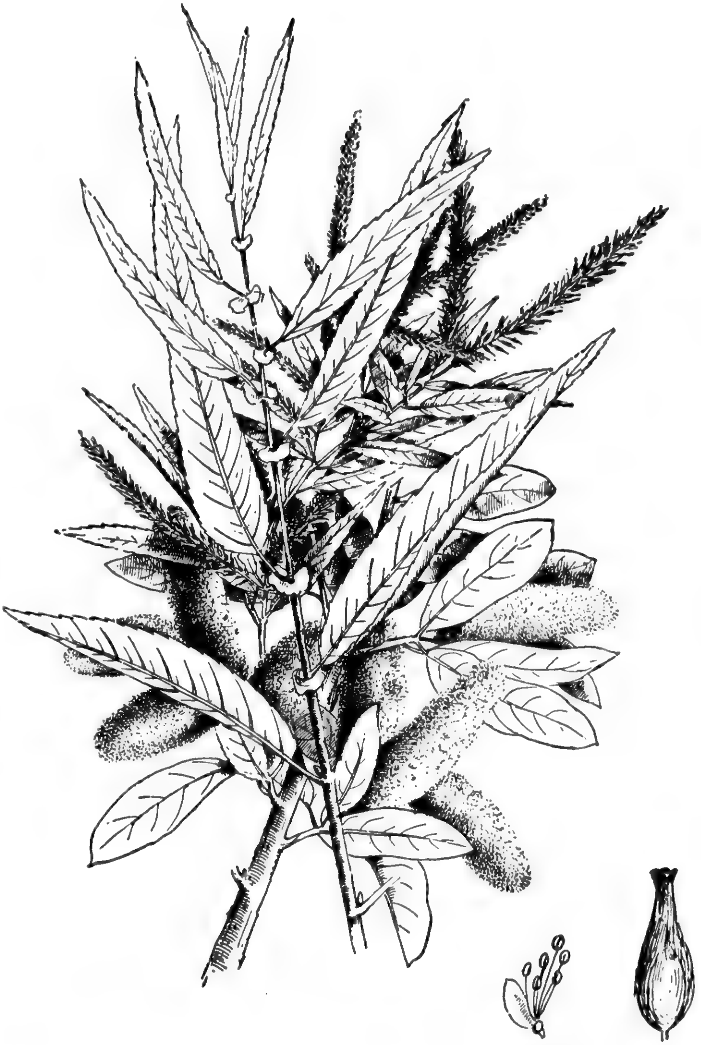
BLACK WILLOW. (*Plate XVII.*)

Sàlix nìgra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Head open, irregular; branches, stout, upright.*	15-35 *feet.*	*New Brunswick southward and westward to California.*	*April, May.*

Bark: Blackish or light brown; rough; flaky. *Branches:* yellowish brown; slender; brittle at the base. *Stipules:* inclined to vary. *Leaves:* simple; alternate; about two inches long, with short petioles; narrowly lanceolate, pointed at both ends or wedge-shaped at the base; finely and sharply serrate or entire; pubescent, and later becoming smooth excepting along the midrib; the under side paler than the light green upper surface. *Flowers:* growing in catkins and terminal at the end of the season's branches. Staminate ones with from three to five stamens. Pistillate ones scaly.

A particular charm and freshness seems to cluster around the willows; and although about one hundred and sixty species of them are recognised by botanists, there runs so strong a family resemblance through them all that it would be difficult to confuse any one of them with another genus. By their general aspect and leaves many of the species can be known. The study of the differences in their flowers is one that requires minute observation and carefulness. Although each one of the willows has its own habitat, the greater number of them are fond of water and seek the river's edge. Here they have their own work to do in holding the soil together and often forming strong breastworks against the wind. They abundantly scatter their seeds, and detached twigs and branches strike root with great facility. In low places and the adjoining meadows their trail can often be followed by numerous ones that have sprung up and whose ancestors live on the river's bank. Salix nigra, however, is seldom found growing away from water. Its wood



Ripe and unripe pistillate flowers. *Stamens.* *Pistil.*

PLATE XVII. BLACK WILLOW. *Salix nigra.*

is soft and weak and from the bark a tonic is extracted that has considerable efficacy in the curing of fevers.

The willows that are native to America are mostly small and do not always become arborescent, many of them being shrubs. Of them, Salix nigra is the most conspicuous. The introduced ones are large and generally fine trees.

SCYTHE-LEAVED WILLOW.

Sàlix nìgra falcàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Irregular; branches stout.*	15-35 *feet.*	*Massachusetts to Florida.*	*April, May.*

Bark: dark grey; rough. *Leaves:* simple; alternate; with short petioles, and two circular leaf-like and serrate stipules at their bases; linear or scythe-shaped; pointed at both ends or having the base slightly rounded; finely serrate; green on both sides; glabrous above and with soft, silky hairs underneath when young.

In its best state of development the scythe-leaved willow is a small tree, and quite as often it occurs as a shrub. Its leaves are characteristic.

WESTERN BLACK WILLOW. PEACH-LEAVED WILLOW. ALMOND WILLOW. (*Plate XVIII.*)

Sàlix amygdaloìdes.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Trunk inclining; branches, curving upward.*	15-50 *feet.*	*New York to Ohio, westward to Missouri and New Mexico.*	*April, May.*

Bark: brownish red; scaly. *Stipules:* reniform, encircling the stem; remotely serrate and falling early. *Leaves:* simple; alternate; with long slender petioles; broadly lanceolate, with pointed apex and pointed or narrowed base; sharply and evenly serrate; dark green above and smooth at maturity, paler and slightly glaucous below. *Flowers:* growing in long, cylindrical and pubescent catkins and terminal at the end of leafy branches. Staminate ones with from five to nine stamens and filaments that are hairy at the base. Pistillate ones with yellow scales.

Most commonly this rather small tree is seen growing along the banks of streams from Ohio to Missouri. It has also a more northern range from Quebec to British Columbia and thrives well about the Great Lakes. It is a native of America.

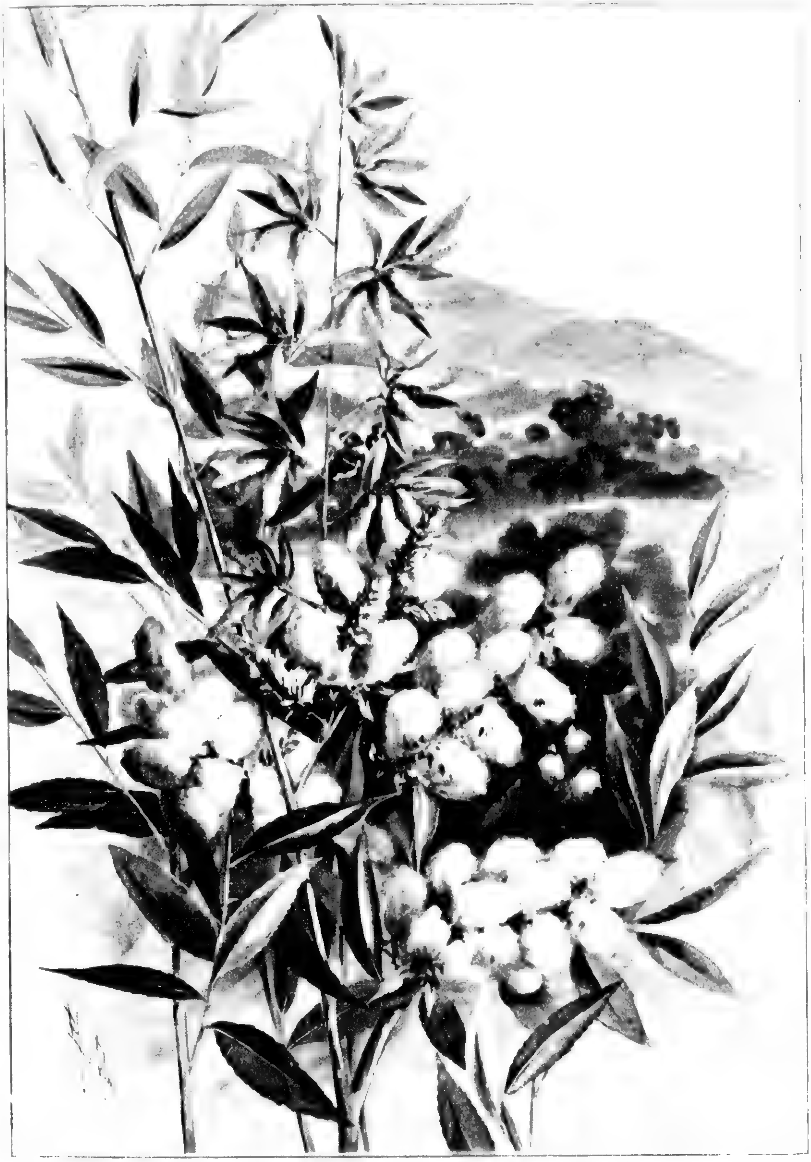


PLATE XVIII. WESTERN BLACK WILLOW. *Salix amygdaloides*

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The accompanying illustration shows the beauty of the pistillate catkins at maturity. The stalks of their capsules have lengthened, and they are bursting that the cotton-tufted seeds may escape.

SHINING WILLOW. AMERICAN BAY WILLOW. GLOSSY BROAD-LEAVED WILLOW. (*Plate XIX.*)

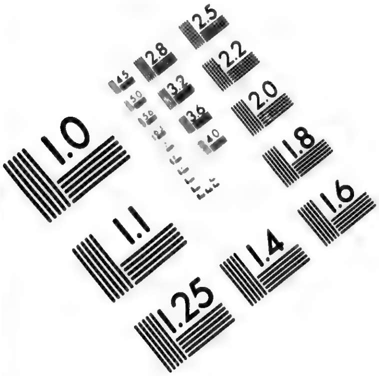
Sàlix lùcida.

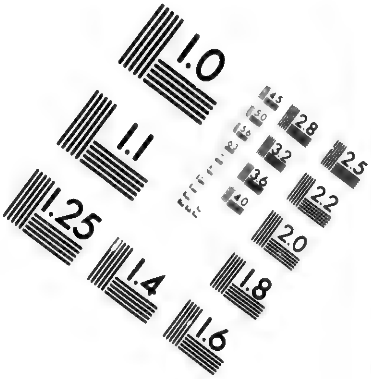
FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Regular, bushy; branches, erect.*	12-20 *feet.*	*New England to N. J. and Kentucky and westward.*	*April, May.*

Bark: dark brown; smooth, or slightly scaly. *Branchlets:* yellowish or green; smooth; polished. *Leaf-buds:* yellowish; ovate; smooth. *Stipules:* mostly persistent; small; oblong or cordate; falling late in the season. *Leaves:* simple; alternate; with short, stout petioles, at most, half an inch long; elliptical or lanceolate, with sharp-pointed apex and narrowed or slightly rounded base; finely and sharply serrate; dark green above, lighter below; smooth; shiny on both sides; the midrib whitish and distinct. *Catkins:* short, with leafy bracts and terminating a sparingly leafy branch. *Staminate ones:* fluffy, with five or more stamens in each flower. *Pistillate ones:* long; dense.

We have no more beautiful willow shrub than Salix lucida. It is a native species. In the swamps or along the borders of streams it appears to attract and hold the sunshine which makes a gay shimmering upon its glossy leaves.

About the catkins of the willows,—they are borne on different plants; and in the springtime we see many sorts of insects darting in and out among them. They are busy seeking honey and also performing the service of cross-fertilization. That so many flowers grow in one inflorescence is a fact which must always appeal to the sagacious insect. From twenty-five to one hundred pods have been counted in a willow catkin. He can therefore suck the honey and carry off the pollen with much greater rapidity than he can when flowers are borne singly. To save time, it must be remembered, is a most important matter, for the more flowers that can be fertilized the better it is for the tree. When the pollen is ripe it should then be carried to another flower, otherwise it is liable to be injured





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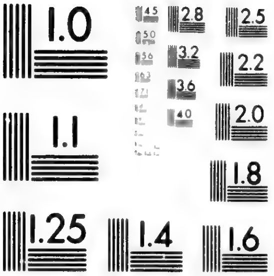

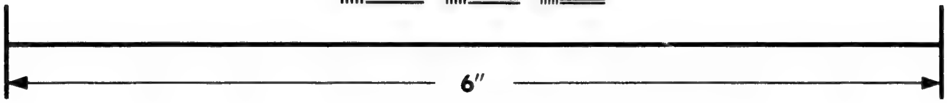

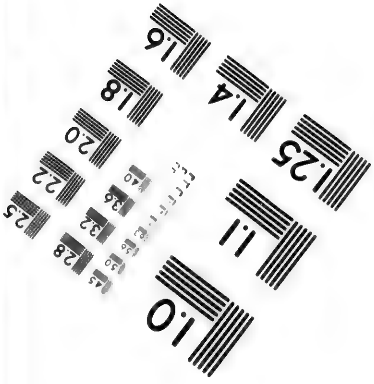

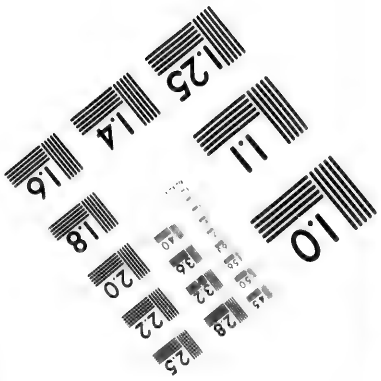

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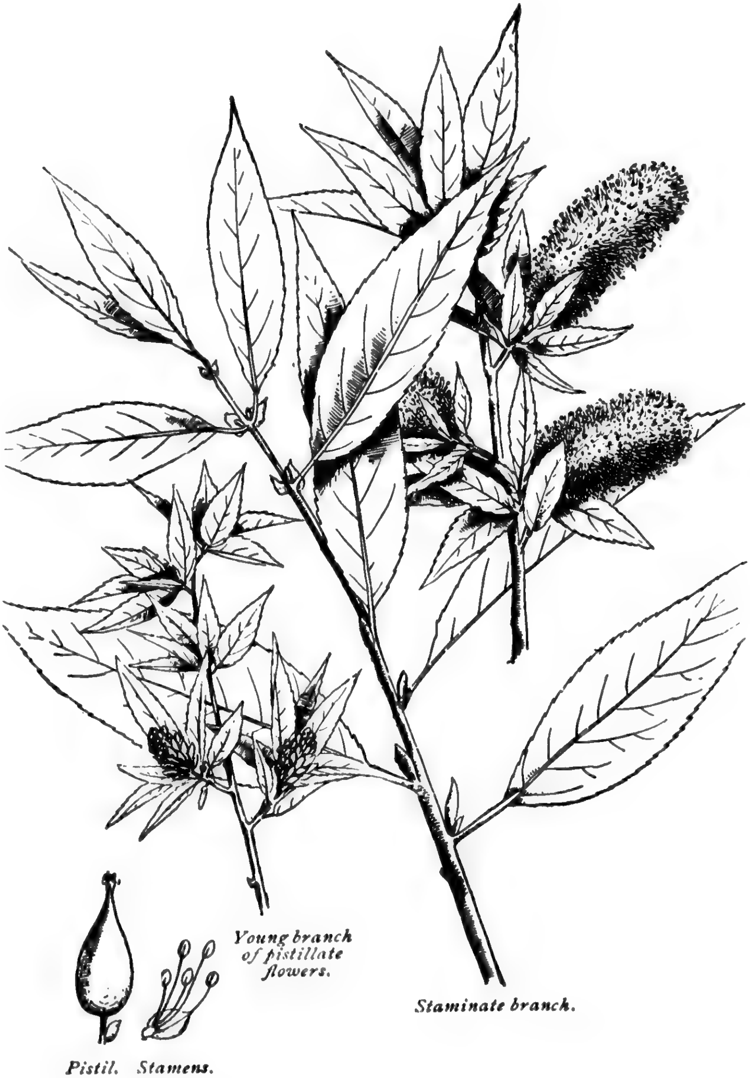
Young branch of pistillate flowers.
Staminate branch.
Pistil.
Stamens.

PLATE XIX. SHINING WILLOW. *Salix lucida.*

by rains or in many other ways. The fertile catkins can be easily distinguished. They are generally the short, green ones that develop soon after the sterile ones have been stripped of their golden pollen.

The seeds of the willowsare very small. Amid the tufts of cotton-like hairs which surround them at the base it is almost with difficulty that they are detected. When the pods open their beaks to release them, the slightest breeze is able to carry them aloft, and the air is often apparently filled with their lint. Of the millions that are tossed about very few germinate and become shrubs of trees. Nature is far seeing and, knowing the many imminent perils of their existence, strews with a lavish hand.

BEBB'S WILLOW. LONG-BEAKED WILLOW. OCHRE-FLOWERED WILLOW. (*Plate XX.*)

Sàlix Bebbiàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Bushy; branches, erect.*	4-18 *or* 25 *feet.*	*Hudson Bay to New Jersey, northward and westward.*	*April, May.*

Bark: dark green or reddish. *Branches:* yellowish. *Twigs:* reddish brown; pubescent when young. *Stipules:* semi-cordate. *Leaves:* simple; alternate; elliptical or oblong-lanceolate, tapering into a point or blunt at the apex and rounded or wedge-shaped at the base. *Edge:* variable; remotely toothed; wavy; serrate or entire. Dull olive-green and smooth above, pale bluish green and covered with silky hairs underneath, becoming glabrous; thin. *Flowers:* growing in sessile catkins and appearing with the leaves. *Staminate catkins:* long; obovate; pale yellow at maturity. *Pistillate catkins:* rather short and with flowers growing loosely in them.

In earliest spring, almost as soon as the sap has begun to flow under the bark of this willow, its catkins hasten to develop and glisten in contrast to the bareness of the earth. The leaves do not fully unfold until some time later. Although the flowers in these strange little catkins have no beautifully-coloured envelopes, the rich yellow anthers of the staminate blossoms can hardly fail to attract the attention. Thousands of bees are seen buzzing about them. This species is one that is a native of America, and it occurs either as a shrub or as a

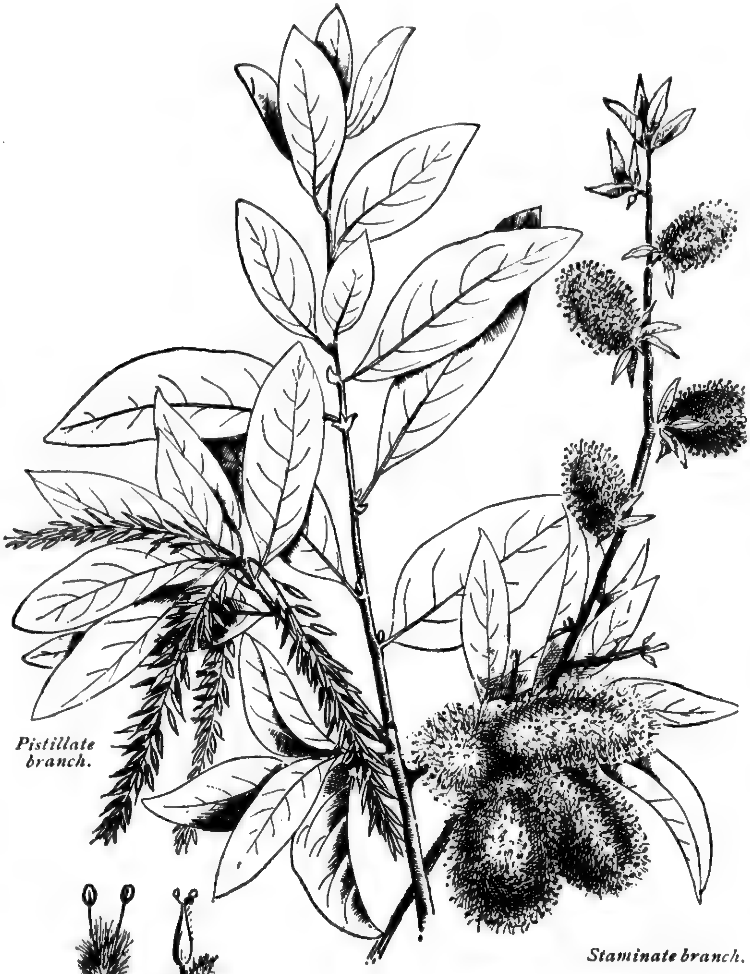
Pistillate branch.
Staminate branch.
Stamens.
Pistil.

PLATE XX. BEBB'S WILLOW. *Salix Bebbiana.*

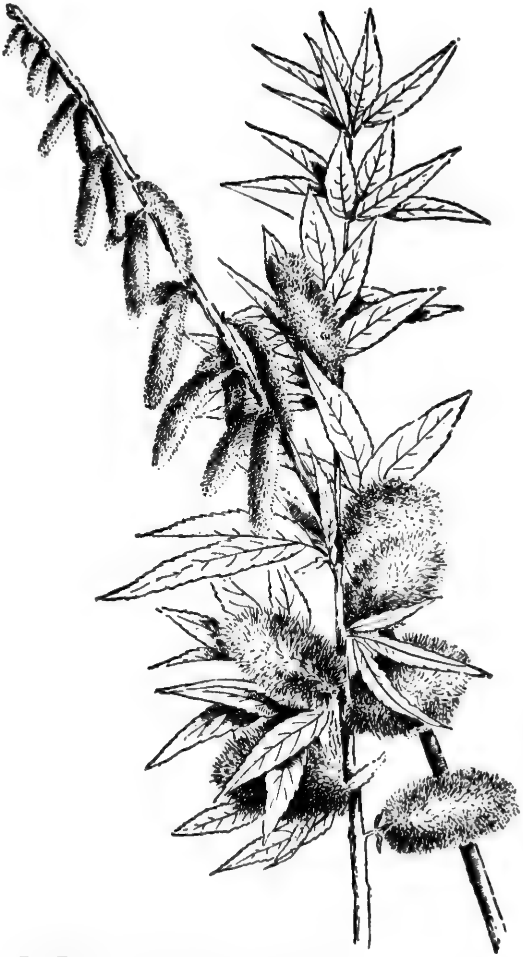

PLATE XXI. SILKY WILLOW. *Salix sericea.*

small tree. It establishes itself along the borders of woods and often in dry soil as well as remains faithfully by the side of streams.

SILKY WILLOW. (*Plate XXI.*)

Sàlix serícea.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Bushy, irregular.*	5-12 *feet.*	*Maine southward to Virginia.*	*May.*

Twigs: reddish purple; slender. *Stipules:* narrow; deciduous. *Leaves:* simple; alternate, with petioles three to four inches long; lanceolate, with taper-pointed apex and pointed or rounded base; serrate; extremely soft and silky when young. As the leaves dry they turn dark brown or black. *Flowers:* growing in long sessile catkins with leafy bracts at their bases.

Surely there is an inspiration to be found in the willow shrubs as they unfold the earliest signs of spring. About them there is a golden halo as soon as the sap begins to flow. The little buds expand so radiantly, and the shy catkins peep out and grow longer with every touch of warm, sunny air. There is something so fresh and lively about them. They are eager to cast off every sign of deadness. Along the streams and by the borders of swamps the silky willow seems to cling with a tender affection. The shrub is a native of America.

WEEPING WILLOW. RING WILLOW. (*Plate XXII.*)

Sàlix Babylónica.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Branches, pendulous.*	30-60 *feet.*	*In cultivation.*	*April, May.*

Bark: grey; rough. *Twigs:* greenish; long; drooping; supple; bitter to the taste. *Leaves:* simple; alternate; linear-lanceolate; pointed at both ends; sharply serrate all around; when young slightly pubescent on the under side. *Flowers:* diœcious; growing in long, loose catkins with entire scales and terminal at the end of short, leafy and lateral branches.

When the spring winds skimmer gaily
  Along the mirthful stream,
Then the stately, reverend willow
  Wears a gown of tender green.

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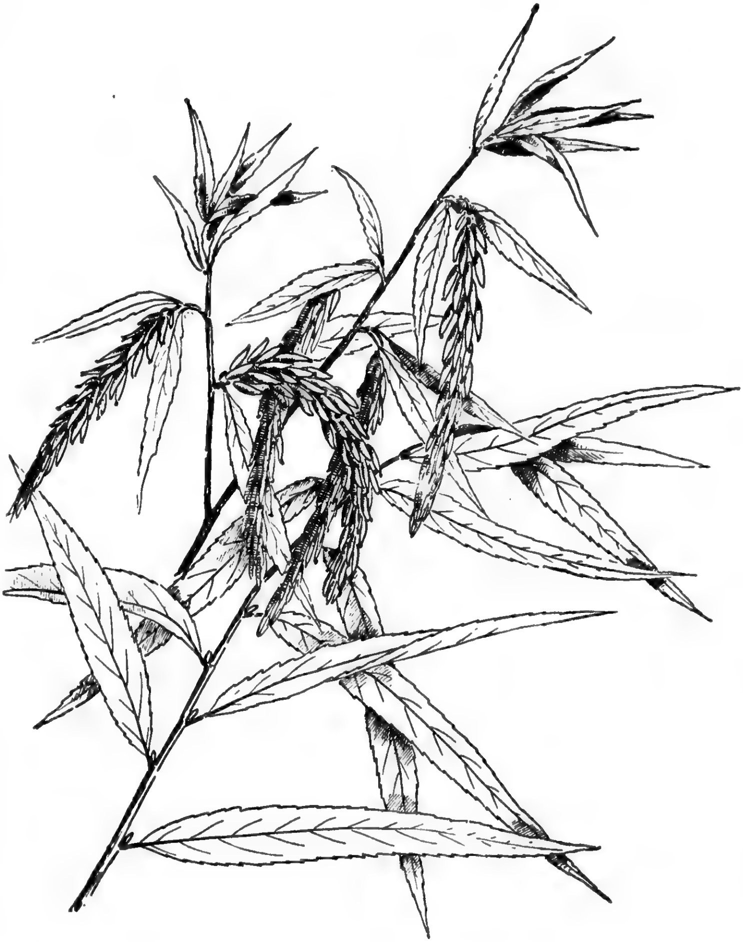


PLATE XXII. WEEPING WILLOW. *Salix Babylonica.*

And throughout the happy summer
It breathes as oft before—
For its heart is grave and solemn—
The sweetest tales of yore.

'Till in tune with winter's sorrow
It moans a plaintive cry,
And its boughs are bent with weeping
That calms the passer-by.

Sàlix Babylònica.

There is, perhaps, no other tree about which more sentiment clusters than the weeping willow. It is not like a flower that remains on the earth only long enough to accomplish its purpose of reproduction; it lives to cast its shade upon many generations. When it has attained a great age and grown to a large size there is a gravity about it which is most impressive. The idea of its weeping and its specific name have, it is said, been suggested by the lamentation of the Hebrews in Psalm cxxxvii, although Populus Euphratica is also believed to be the Garab-tree of the Arabs, and the weeping willow of the Psalmist.

"By the rivers of Babylon, there we sat down, yea, we wept, when we remembered Zion.

We hanged our harps upon the willows in the midst thereof."

Thoreau, however, who is always cheerful, says of the tree: "It may droop—it is so lithe and supple—but it never weeps. It droops not to represent David's tears, but rather to snatch the crown from Alexander's head."

The story of its introduction into Europe and America from the Orient is an interesting one. Shortly after Alexander Pope had built his villa at Twickenham on the Thames, he received from a friend in Smyrna a drum of figs. Within it there also was a small twig which excited the poet's curiosity. He stuck it in the ground by the river's bank. It rooted, and soon grew to be the delight of Pope and his friends. Were it still standing it would be regarded with peculiar interest ; for it was the ancestor of all those that have since lived in Europe and America. In 1775 a young British officer who went to Boston took with him, carefully wrapped in oiled silk, a twig from Pope's willow. His expectations of settling peacefully in the new world were not as speedily fulfilled as he had anticipated, and so he presented the twig to Mr. Custis, the step-son of General Washington, who planted it near his home at Abingdon, Virginia. There it took kindly to the soil and grew vigourously. It was a child of Pope's willow, and the first one to strike root in America. Later, in 1790, General Gates took a twig from the tree and planted it at the entrance to the farm he had bought on Manhattan Island. It also grew to a considerable size, and for many years was familiarly known as Gates' weeping willow. The entrance to the farm where it stood is now Third avenue and Twenty-second street.

It is believed that the staminate trees have never been introduced into this country, and the willow is, therefore, not able to reproduce itself by seed. The twigs of S. Babylonica have been used as divining rods, and Herodotus mentions that the Scythians found them excellent for this purpose.

S. Babylónica annuláris, hoop willow, is known by the peculiarity of its leaves. They curve and recurve into rings.

WHITE WILLOW. HUNTINGTON WILLOW.

Sàlix álba.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Thick set, branches, ascending.*	50-90 *feet.*	*Introduced, New York and Penn.*	*April, May.*

Bark: grey; rough. *Twigs:* olive-green, not yellowish; brittle. *Stipules:* lanceolate ; deciduous. *Leaves:* simple ; alternate ; with very short petioles ; lanceolate to linear, tapering at both ends ; sharply serrate ; pubescent on both surfaces, the lower one retaining its white, velvety hairs even when mature. *Catkins:* growing at the end of the season's short, leafy shoots.

Although generally familiar and common throughout a considerable part of the country, S. alba is one of the introduced willows that have escaped from cultivation. Its growth is free and rapid; as though it were quite independent of all care and attention. Of the species there are several varieties, and it is not always a simple matter to tell them from each other. The fact that its own twigs are not yellowish will serve in one instance to distinguish it from *S. àlba vitellìna*, yellow willow, or golden osier.

S. álba cærùlea has olive coloured twigs, and its leaves are of a bluish green hue.

S. álba argéntea, as the name implies, has foliage that is very silvery. This is a particularly beautiful feature of the tree, and when a strong breeze is seen playing through it the under surfaces of the leaves appear like flashes of light through the green.

YELLOW WILLOW. GOLDEN OSIER. (*Plate XXIII.*)

Sàlix álba vitellìna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Erect, thick; spreading broadly.*	30-40 *feet.*	*Introduced, general in U. S.*	*May.*

Twigs: yellowish green or reddish; smooth; brittle at the base. *Leaves:* simple; alternate; lanceolate; pointed at both ends; when very young often blunt or rounded at the apex; sharply serrate; pubescent, the silky white hairs appearing on the upper surface of the leaf as well as underneath. This is especially so when young. *Catkins:* long; slender.

Early in the spring especially, a golden glow from this willow appears to lighten the whole of its surrounding atmosphere. It is a tree very common in America, perhaps the most so of any one of the family. Even about old houses it is found, and it grows abundantly in low places.

For its commercial value the golden osier has been extensively planted in France, where it principally supplies the market with hoops, and it is also exported by the French to Great Britain and other countries.

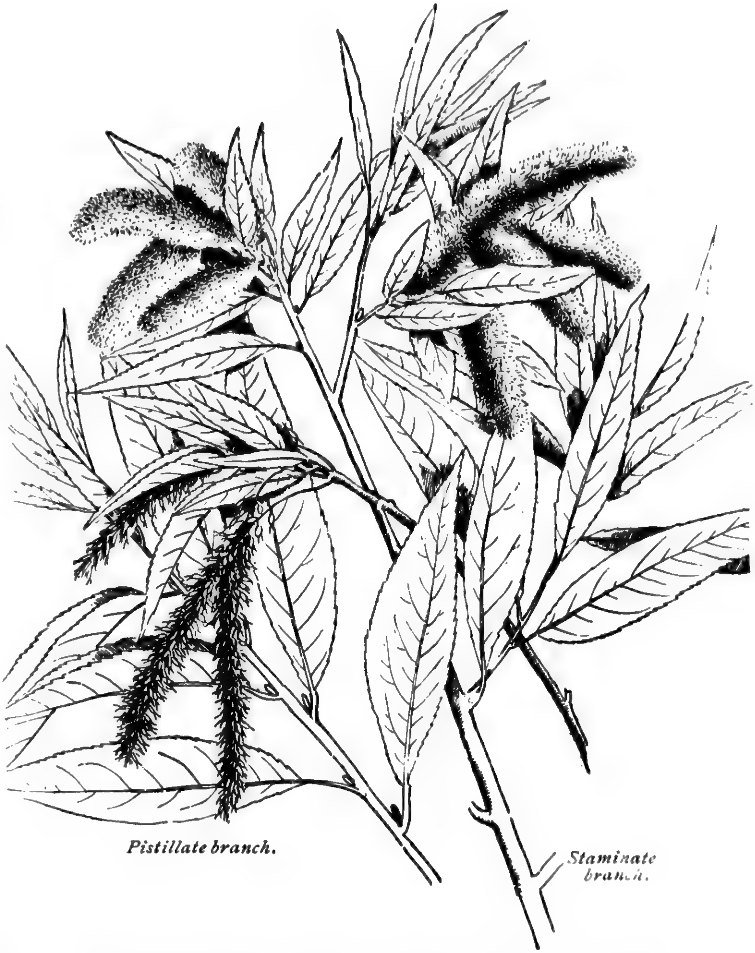

Pistillate branch.
Staminate branch.

PLATE XXIII. YELLOW WILLOW. *Salix alba vitellina.*

BRITTLE WILLOW. CRACK WILLOW. (*Plate XXIV.*)

Salix fragilis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Head, bushy, irregular.*	60-80 *feet.*	*Introduced, Mass. to N. J. and Penn.*	*April, May.*

Bark: grey; slightly rough. *Branches:* greenish, tinged with red; smooth; very brittle at the base, the most so of any species with this characteristic. *Leaves:* simple; alternate, with smooth petioles with two wart-like extuberances near the base of the leaf; lanceolate; taper-pointed at both ends; unevenly and sharply serrate, the teeth somewhat incurved; smooth and dark green above, whitish below and only slightly downy, even when young. *Flowers:* growing in catkins at the ends of the season's leafy shoots. *Staminate catkins:* shorter than the long, loose pistillate ones.

Among the willows, Salix fragilis has its distinct place, and it is regarded as a valuable tree. From its withes much of the basket work with which we are so familiar is made, and the industry in Europe, where it is generally distributed, is a large one. The timber that it yields is fine and of a rich salmon colour. From the old plants its twigs break away and grow into new ones with astonishing facility. It is probably in this way that it has escaped so widely from cultivation. It has also many varieties and hybridizes well with other species.

An amusing story is told of a country school mistress who prided herself on her knowledge of the family of willows. One day she told a young lad to fetch her a twig with which she might flog him. He sought one of a near-by willow and, being wise in his generation, made slight circular incisions all along the twig with his ever-ready pen-knife. When he returned, he calmly held out his hand to the mistress. She raised the twig; but before the first blow was fairly administered, it had flown in innumerable pieces all over the room. "It is the brittle willow," said she with an air of wisdom to the rest of the pupils.

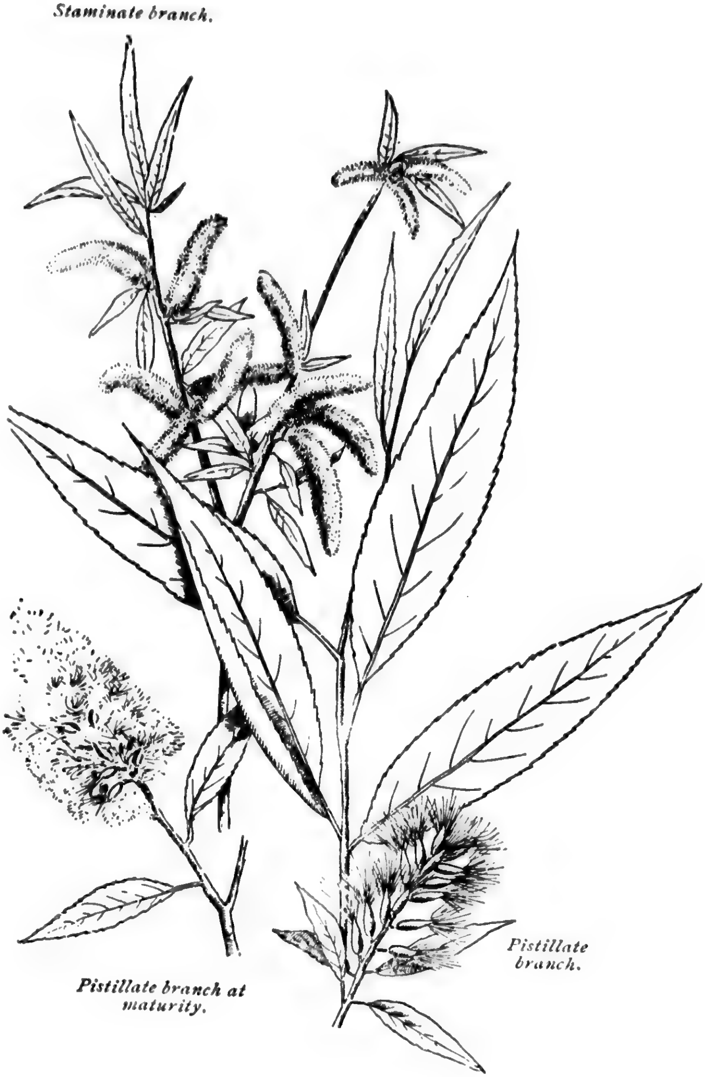

Staminate branch.
Pistillate branch at maturity.
Pistillate branch.

PLATE XXIV. BRITTLE WILLOW. *Salix fragilis.*

DOWNY POPLAR. RIVER COTTONWOOD. SWAMP COTTONWOOD. (*Plate XXV.*)

Pópulus heterophýlla.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Head narrow, round-topped; branches, irregular.*	40-80 *feet.*	*Southern Conn. southward and westward.*	*April, May.*

Bark: reddish brown; rough; and broken into long, narrow plates. *Leaves:* simple; alternate, with long, round petioles; rounded ovate, with blunt apex and cordate base, the lobes of the base often overlapping the leaf-stem; serrate, with obtuse and incurved teeth. When young the leaves are covered with a white wool which falls as the leaves mature; the veins and petioles, however, always retain traces of the down. *Staminate catkins:* very large; dense; drooping. *Pistillate ones:* raceme-like; loose.

Pópulus heterophýlla.

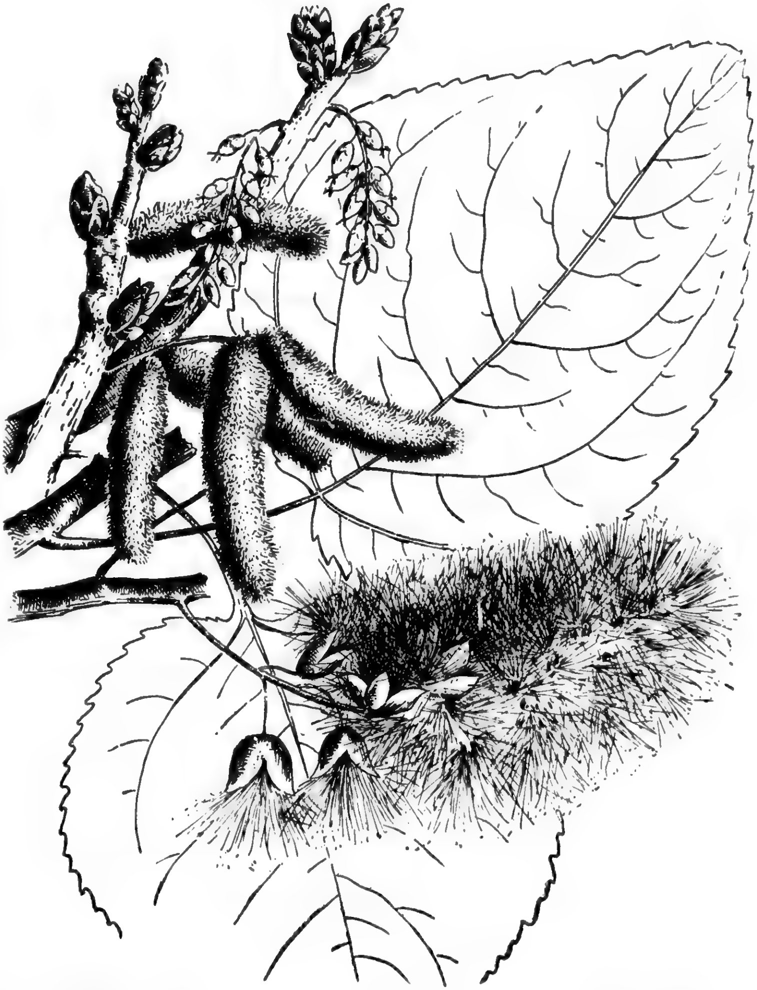
It almost seems as though a little innate stubbornness were displayed by this tree in the persistent bluntness of its leaf. It also clings with much tenacity to the soft down of its early youth. That it has these decisive characteristics, however, affords us a good means of its identification. When its tiny seed is caught on its upward sail in the air, and examined, it is found to be snugly placed within a mass of silvery, white hairs which at their bases are tinged with orange-yellow. This touch of colour and the beauty of the design for its purpose in a thing so small is only another instance of the fineness of Nature's conceptions. In the northern Atlantic states the tree is local and rare. Its wood is closely-grained, but soft and not durable.

BALSAM POPLAR. TACAMAHAC.

Pópulus balsamífera.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Erect; narrow, open head.*	60-80-100 *feet.*	*Northward and westward.*	*April.* *Fruit: May, June.*

Bark: grey, tinged with red; ridged; bitter. *Branches:* smooth, with wart-like excrescences. *Leaf-buds:* large; covered with a yellow, resinous gum



Staminate and pistillate catkin. ***Bursting catkin.***

PLATE XXV. DOWNY POPLAR. *Populus heterophylla.*

which is scented like balsam. *Leaves:* simple; alternate; ovate-lanceolate; pointed at the apex and rounded or sub-cordate at the base; three-ribbed; finely serrate; bright green and shiny above, rather whitish below; glabrous. *Flowers:* diœcious; growing in drooping catkins, and appearing some time before the leaves. *Stamens:* numerous. Scales of the pistillate flowers recurved at the apex.

It must be a dull heart that is not stirred by the sight of this noble tree. Against the intense blue of a summer's sky its great size and stately trunk make it indeed a noteworthy object. It grows along the borders of streams and lakes and inhabits bottom lands that have been inundated. Occasionally it is found in dry soil. The fishermen of the Great Lakes know the tree well. They seek the outer bark from the base of old trees and use it as they would cork to float their nets. The wood of the tree is brown and soft. It is made into pails, tobacco boxes and also paper pulp.

BALM OF GILEAD. HEART-LEAVED BALSAM POPLAR. (*Plate XXVI.*)

Pópulus cándicans.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Head, broad, open; branches, spreading.*	40-50 *feet.*	*In cultivation.*	*April.*

Bark: greenish grey, the branches often darkly spotted. *Leaf-buds:* large; fragrant. *Leaves:* simple; alternate, with petioles that are almost round and more or less hairy; broadly-ovate, or cordate, pointed at the apex and heart-shaped at the base; coarsely serrate; netted-veined; the margins outlined by fine white hairs. Bright green above; whitish below; pubescent along the ribs and veins. *Flowers:* growing in catkins, similar to those of the preceding species.

This beautiful tree with its gracefully-shaped and abundant foliage is frequently planted about dwellings and along drives. It has in fact quite abandoned the forests and no longer luxuriates in a state of wildness. Professor L. H. Bailey, however, tells us that it is indigenous in Michigan and that there, it is said, groves of it existed when the country was first settled. Afterwards they were cut down to supply lumber. It is distinguished from the balsam poplar, of which it has been re-

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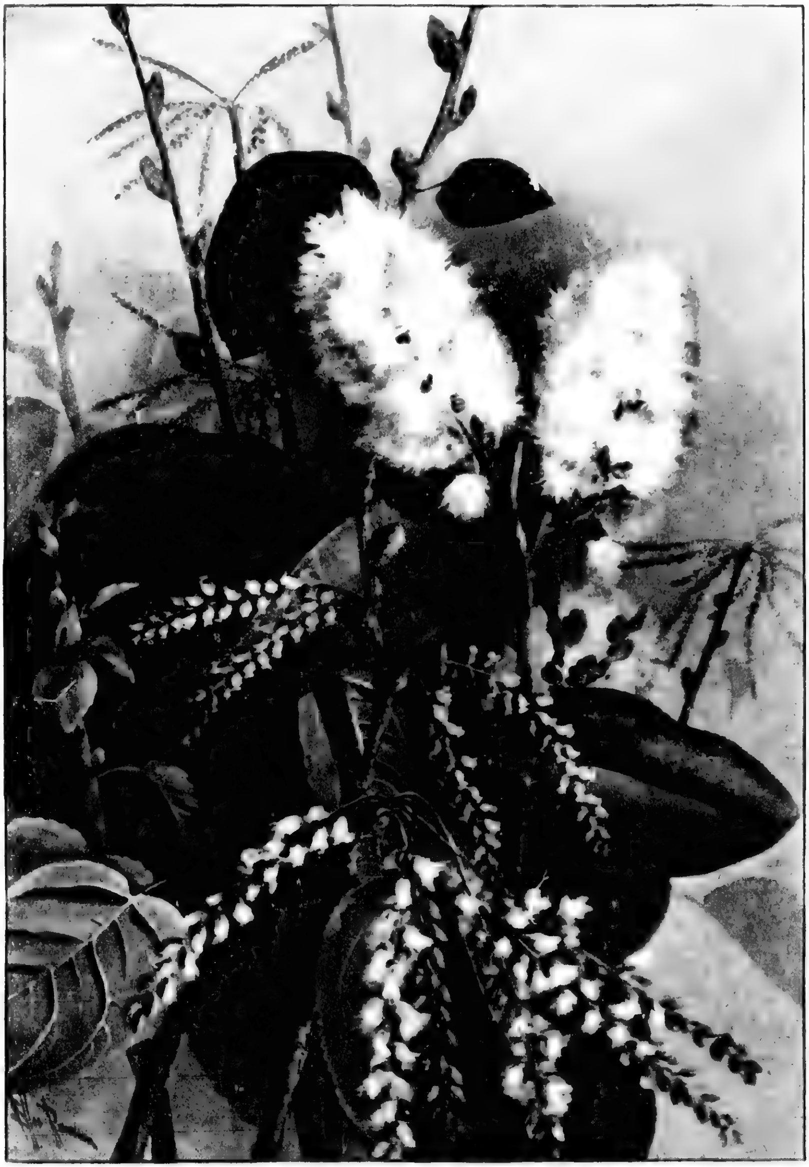

PLATE XXVI. BALM OF GILEAD. *Populus candicans.*

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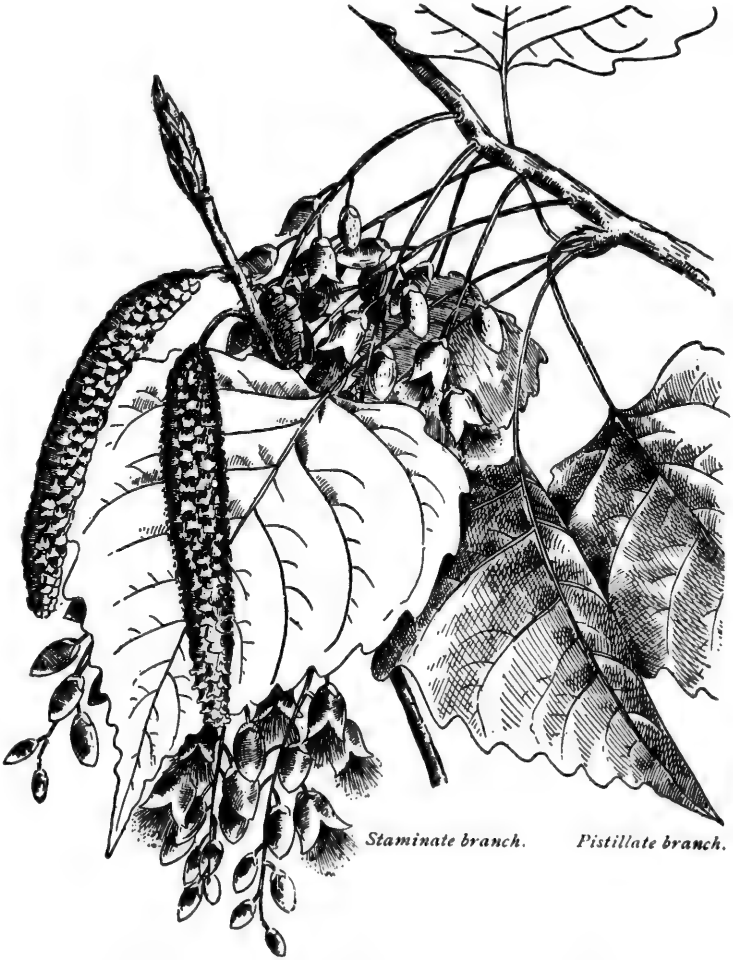

Staminate branch.
Pistillate branch.

PLATE XXVII. COTTONWOOD. *Populus deltoides.*

garded as a variety, by the width of its leaves with their cordate bases and ciliate margins and by their pubescence.

The seeds have wonderfully fine hairs which envelop the fruit with thick masses of soft, snow-white cotton. The illustration shows the pistillate catkins at maturity. Then the seeds become detached from their capsules and are wafted by the breezes to great distances from the trees.

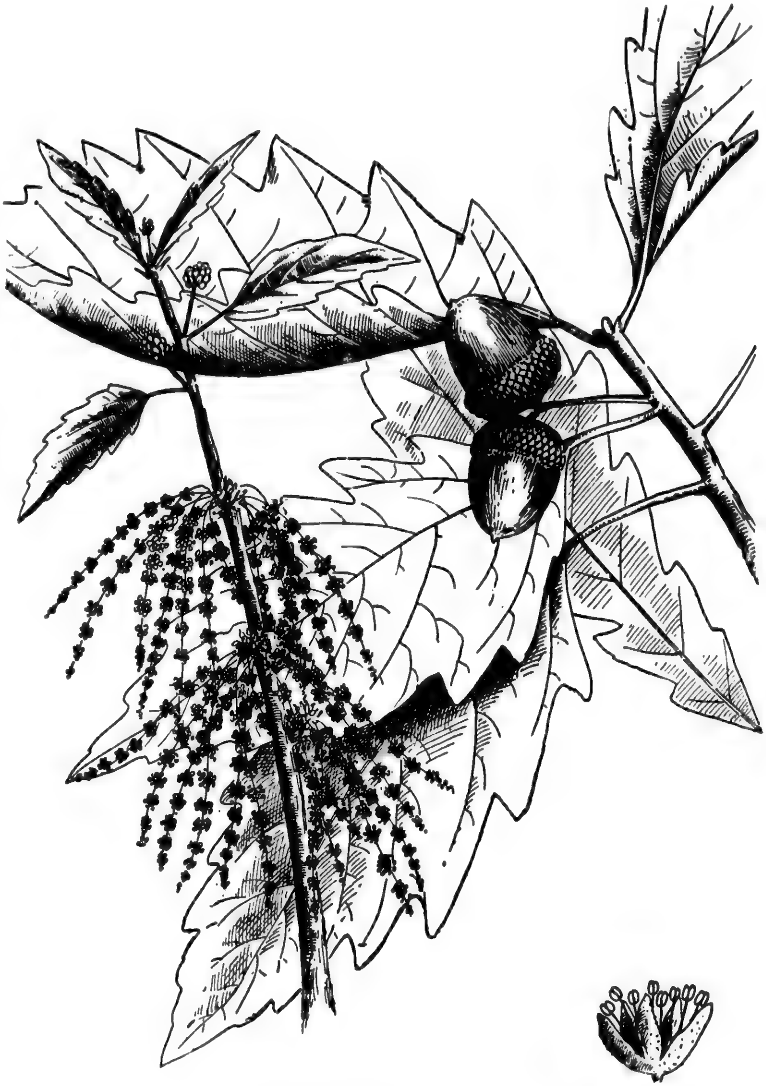
COTTONWOOD. RIVER POPLAR. CAROLINA POPLAR. NECKLACE POPLAR. (*Plate XXVII.*)

Pópulus deltoìdes.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Symmetrical, open head.*	80-150 *feet.*	*Quebec westward and southward to N. J., Fla. and New Mexico.*	*April.* *Fruit: J·*

Bark: granite-grey; smooth when young but becoming rough and furrowed with age and breaking off in short, flaky pieces. *Branchlets:* greenish. *Leaf-buds:* glutinous, with a substance like balsam. *Leaves:* simple; alternate, with stout petioles which are flattened sidewise; broadly-ovate, with taper-pointed apex and squared or slightly cordate base. Irregularly and coarsely serrate, with incurved teeth; when young, sticky and fragrant like balsam; occasionally coarsely pubescent underneath; the margins fringed; at maturity bright green, smooth and glossy above, paler below; ribs whitish on both sides; thick. *Flowers:* diœcious; growing in catkins, and appearing before the leaves; the fertile ones sometimes a foot long; their scales cut-fringed. *Sterile catkins:* growing on stout stems; dense. *Seeds:* covered with a whitish or rusty coloured substance.

There is to-day standing in Washington Hollow, Dutchess county, New York, a cotton-wood tree the trunk of which measures fifteen feet, two and a half inches in circumference. The soft grey of its bark and its lustrous restless foliage form an imposing spectacle against the sky. By those that live near its shade its slightest movements are watched with interest. Owing to the softness of its wood large branches are apt to break away from the tree when there is a high wind. To look out in the night when a storm is raging and see that all is safe,—that no danger is impending from the cotton-wood,—has become a custom. During the first part of June it is also a care to those that live near it. It is then that its tiny seeds which are not more than one twelfth of an inch long begin to



Flowering branch. *Single flower.*

PLATE XXVIII. SWAMP WHITE OAK. *Quercus platanoides.*

fly. They are hidden within a mass of soft, delicate cotton which is surrounded by tufts of long, white or rusty coloured hairs. As if with fleecy, etherial sails, they are then borne aloft by the slightest breeze. So abundantly are they dispersed that they have to be taken up in quantities from a near-by strawberry bed, and when the windows on the tree's side of the house are left open the seeds can be gathered in basketfuls from under the furniture. This cotton-like fibre which surrounds the seeds of the poplar has been experimented with for the manufacturing of cloth; but as yet the enterprise has not proved itself financially successful. Its wood also is of little value commercially and warps badly in drying. This poplar is the most rapid-growing tree of eastern North America and under favourable circumstances reaches a height of forty feet in five or six years.

East of the Rockies the tree has been much planted; but it is not regarded as being long lived or thriving well in other than a moist soil. Its natural habitat is along the banks of rivers and streams and by lakes. Not one of the least remarkable features of the large tree that has been mentioned is the fact that it grows in dry soil.

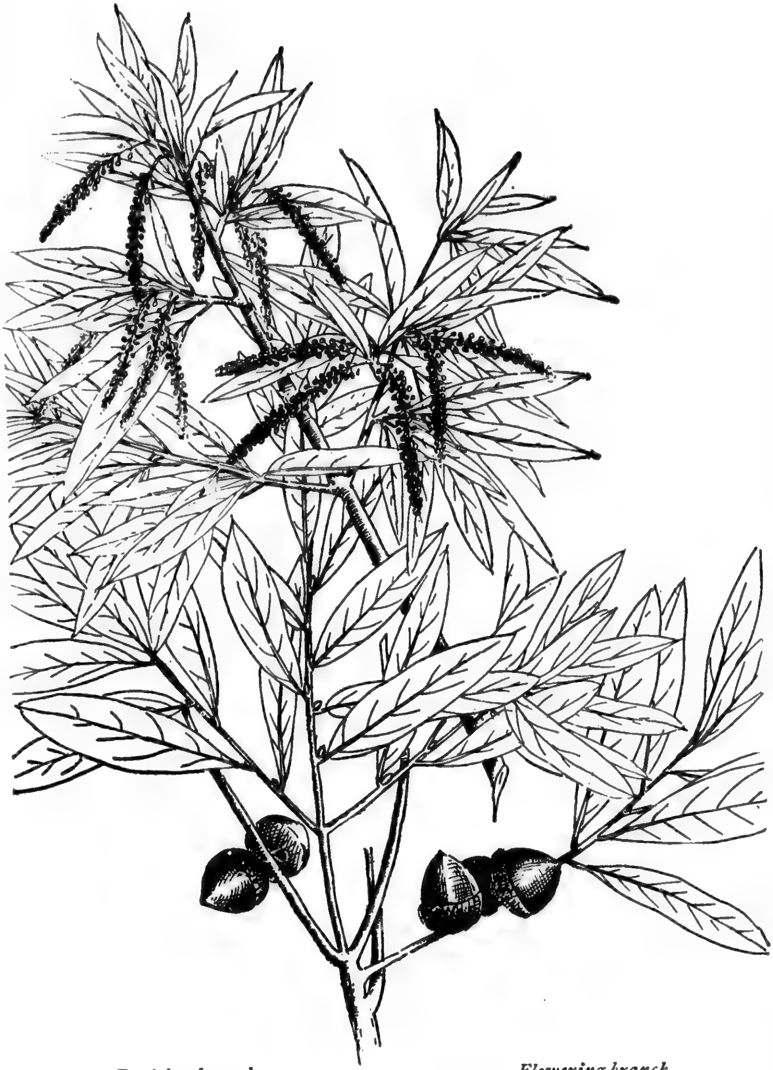
SWAMP WHITE OAK. (*Plate XXVIII.*)

Quércus platanoìdes.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Head, narrow, round-topped; lower branches, somewhat declined.*	30-70 *feet.*	*Maine to Iowa, southward to Delaware and Georgia.*	*May, June.* *Fruit: Sept., Oct.*

Bark: light grey and divided into large, flat, flaky scales. *Leaves:* simple; alternate; obovate, with wedge-shaped and entire base and pointed or rounded at the apex; sinuate-toothed, the waves far apart and so large as to resemble small lobes; sinuses rounded and those of the middle waves extending deeper into the leaves than the others; dull, dark green above and smooth; silvery and downy underneath. The ribs appear rusty. *Acorns:* ovoid; growing usually in pairs on a puduncle sometimes three inches long. *Cup:* round; covered with pubescent scales, the upper row becoming bristle-like and forming a fringe about the edge. *Nut:* chestnut-brown; oval; about one inch long; edible; sweet.

To see this tree in all the glory of its best development we



Fruiting branch. *Flowering branch.*

PLATE XXIX. WILLOW OAK. *Quercus Phellos.*

should go to the region of the Great Lakes. When its identity is once known it is not easily forgotten, or confused with other trees. The manner in which its lower bark separates into thin scales and the little weird branches that are so often pendulous from larger limbs—and sometimes from the trunk—make it a marked figure on even a winter's landscape. From its leaves it is known as belonging to the group of chestnut oaks, as in outline they somewhat resemble those of the chestnut tree.

The wood of the swamp white oak is light brown, closely grained and strong. Commercially it is not distinguished from that of the white oak, *Q. alba*, and of the burr oak, *Q. macrocarpa*. Pages 188 and 132 respectively.

WILLOW OAK. PEACH-LEAVED OAK. (*Plate XXIX.*)

Quércus Phellos.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Conical head; branches, slender.*	30-80 *feet.*	*L. I. and N. J. southward and westward.*	*April, May.* *Fruit: Sept., Oct.*

Bark: reddish brown; almost smooth, although having close scales. *Leaves:* simple; alternate; with short grooved petioles; lanceolate to ovate-lanceolate, with pointed and bristle-tipped apex and pointed base; entire and slightly undulate edge. When young, brilliant light green and soft above, dull and with a whitish down underneath; becoming thick and shiny above as they grow older. *Flowers:* monœcious. *Acorns:* very small; almost sessile. *Cup:* saucer-shaped; pubescent inside. *Nut:* brown; three-eighths to one-half inch long; globular. *Kernel:* bright orange; bitter.

There seems to be nothing about the foliage of this attractive tree to suggest to us the family to which it belongs; but along with the autumn comes the little tell-tale, the acorn. No doubt there is lurking within it a strong sense of grace and outline, or perhaps a sort of hero-worship for the willows has led it to imitate their leaf. But in any case we cannot believe that it laments having stepped out of the beaten track of its relatives; as its aspect is most gay and happy. In the southern towns it is much planted for ornament and has besides its beauty the advantage of growing rapidly. Its leather-like leaves remain fresh long after those of most other trees have fallen. They

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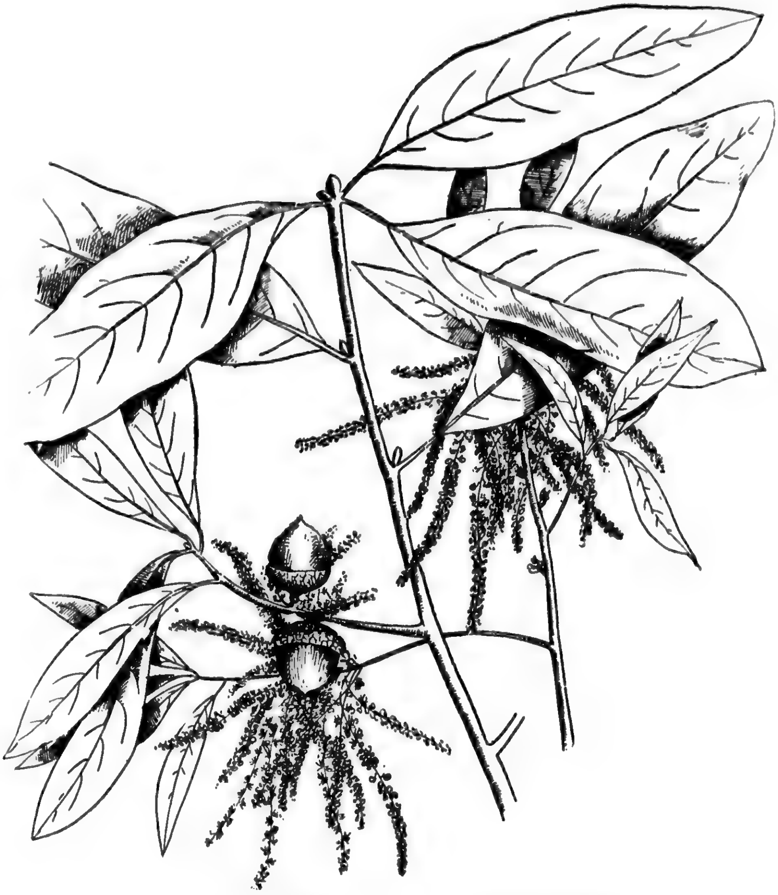

Fruiting branch. *Flowering branch.*

PLATE XXX. LAUREL OAK. *Quercus laurifolia.*

then turn a pale yellow. In moist woods and on sandy uplands the tree occurs as well as by the borders of swamps.

LAUREL OAK. SHINGLE OAK. WATER OAK. (*Plate XXX.*)

Quércus laurifòlia.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Head, dense, round-topped; branches, slender.*	30-80 *feet, or higher.*	*Penn. to Iowa and southward to Fla.*	*March, April.* *Fruit: Oct.*

Bark: nearly black, flatly and broadly ridged. *Leaves:* simple; alternate; with grooved, yellow petioles; long oblong with pointed and bristle-tipped apex and pointed base. Edge entire, although the leaves of young shoots are sometimes undulately-lobed. Bright green, smooth, stiff and glossy above. *Flowers:* slightly downy below. *Acorns:* small; almost sessile. *Cup:* saucer-shaped, with closely compressed scales. *Nut:* globular or ovoid. *Kernel:* bitter.

Two things are most noticeable about this tree: its tall stately trunk and its dark, lustrous head of laurel-like foliage. Within its centre it seems as though the breezes must be held and not allowed to rush madly through as is their wont. The tree is rather generally found east of the Alleghanies. Like that of the willow oak its reddish-brown wood is poor and of little value. One of its common names connects it with the making of shingles, for which purpose it is largely used.

COMMON FRINGE TREE. OLD MAN'S BEARD.
(*Plate XXXI.*)

Chionánthus Virgínica.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Olive.	*Oblong. Head, narrow.*	8-35 *feet.*	*N. J. and southern Penn. southward.*	*June.* *Fruit: Sept.*

Bark: brown, or ashy grey and divided into thin scales. *Leaves:* large; simple; opposite; petioled; ovate or obovate, with pointed or rarely rounded apex and pointed or narrowed at the base. Dark green and smooth above; pubescent underneath when young; thick. *Flowers:* snow-white; fairly fragrant; growing in loose, drooping panicles. *Calyx:* small; four-lobed; tubular. *Corolla:* with four slender petals, three quarters of an inch long, barely united at the base. *Stamens:* two, very short. *Pistil:* one. *Fruit:* bluish purple; oval; glaucous and containing one seed.

The blossoms of the fringe tree are among those things of nature that are seen by all. They make no demand upon that

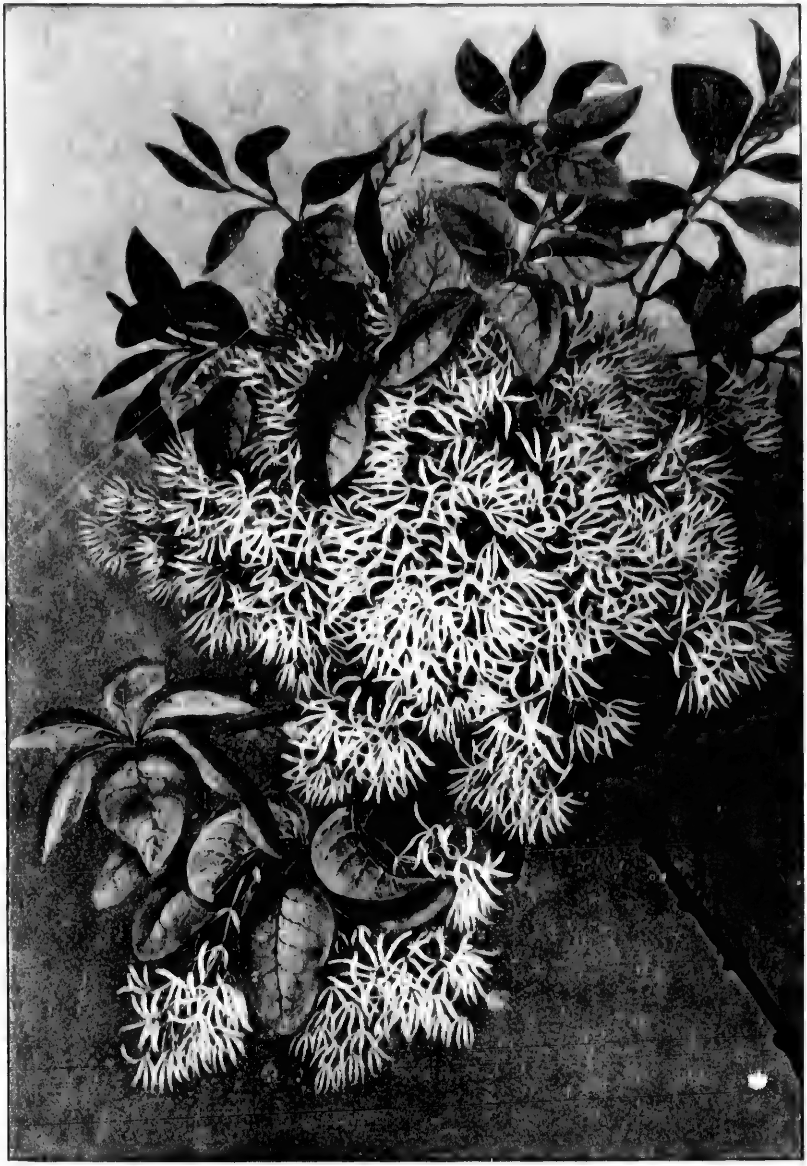

PLATE XXXI. COMMON FRINGE TREE. *Chionanthus Virginica.*

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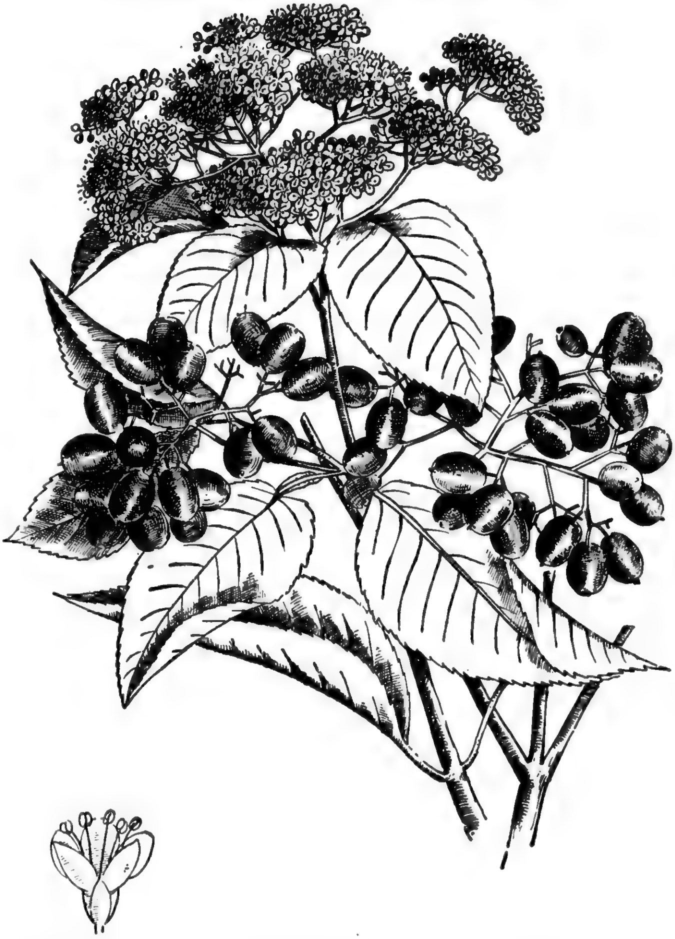

Single flower. *Flowering branch.* *Fruiting branch.*

PLATE XXXII. SWEET VIBURNUM. *Viburnum Lentago.*

Chionánthus Virginica.

more gifted and subtle observation which watches for the earliest signs of spring in growth that is apparently dead and is conscious of the beauty of the golden dust in the catkins of the hazel. They thrust themselves abundantly upon the sight, and the wind stirs their long petals that the attention may not wander from them. And about them there is a grace and fleeciness which is most enchanting. In cultivation the tree is frequently seen, and it would be quite without objectionable features for the ornamentation of parks and grounds were it not that its leaves unfold so late in the season. Before they do so the majority of other trees are already fully clothed with verdure. They remind us of the leaves of the magnolias and in the autumn turn to a uniform tint of bright yellow.

The wood of the fringe tree is closely grained and heavy. From the bark tonic properties are extracted which have been used in the treatment of fevers.

SWEET VIBURNUM. SHEEP BERRY. NANNY BERRY.

(*Plate XXXII.*)

Vibúrnum Lentàgo.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Honeysuckle.	*Round-topped, bushy.*	15-30 *feet.*	*Hudson Bay southward to Ga. and westward.*	*May, June.* *Fruit: Oct.*

Bark: reddish brown and irregularly broken into small, thin plates. *Branches:* light green; very pubescent. *Wood:* hard; unpleasantly scented. *Winter buds:* glabrous. *Leaves:* simple; opposite; with slender margined petioles, the borders of which are wavy and upon which brownish glands are borne; ovate, with pointed apex and rounded base, quite subject to variation; finely and sharply serrate; bright green; glossy; glabrous. *Flowers:* small; white; perfect; growing in broad sessile cymes. *Fruit:* red, turning later to blue-black; ovoid; growing in clusters on red petioles; glaucous; edible; sweet.

The sweet viburnum is a small tree. Along the borders of streams and by swamps it rears itself boldly or seeks seclusion

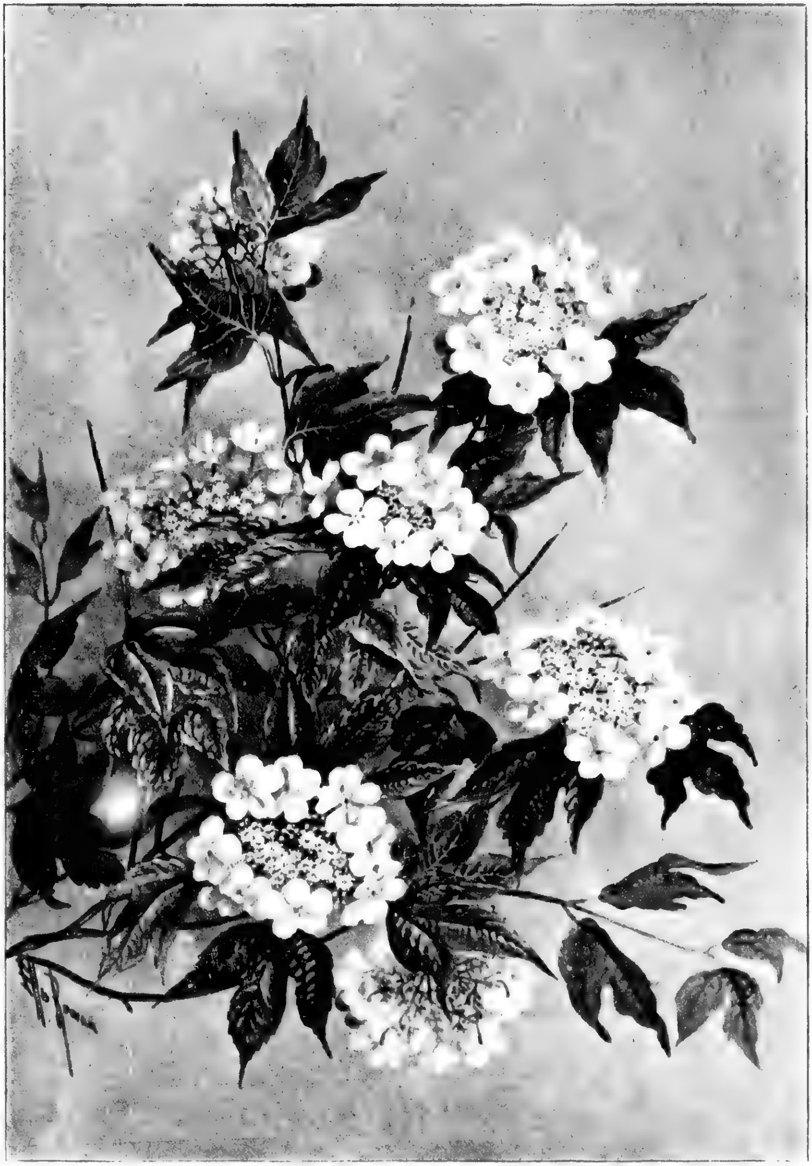

PLATE XXXIII. CRANBERRY TREE. *Viburnum Opulus*

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in the deep woods. No matter, however, how lovely the tree, there is always a slight disappointment in perceiving that it has not the outer row of showy and neutral flowers that we associate with *V. Opulus*, cranberry tree, and *V. alnifolium*, hobblebush.

Both of these are fine shrubs. Of the former, *V. Opulus* (*Plate XXXIII.*), the bark is smooth and grey, and its leaves have from three to five lobes. Its fruit is juicy and acrid and is used as a substitute for the true cranberries.

V. alnifolium (*Plate XXXIV.*) also bears bright scarlet and beautiful fruit, but it is not edible. Its blossoms, however, are very similar to those of the cranberry tree. The orbicular leaves are pointed at the apex, cordate at the base and have upon them a reddish scurf.

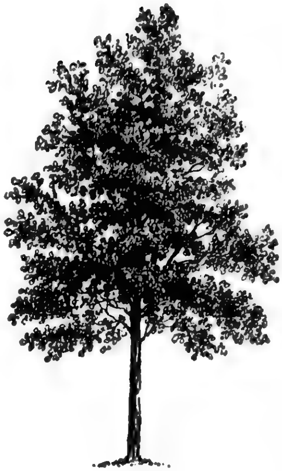
RED MAPLE. SWAMP MAPLE. SCARLET MAPLE. SOFT MAPLE. (*Plate XXXV*, FRONTISPIECE.)

Acer rùbrum.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Maple	*Round-topped; branches, upright.*	30-50 *or* 100 *feet.*	*New Brunswick to Fla., westward to Texas and Dakota.*	*March, April.* *Fruit: May, June.*

Bark: dark grey; rather smooth or flaky when young, becoming rough as it grows older. *Branches* and *twigs:* reddish, marked by longitudinal white lenticels. *Leaves:* simple; opposite; with long, round, reddish petioles; rounded, with from three to five lobes variously shaped and toothed, the lower pair small when present and frequently absent. Apex of lobes, pointed and irregularly serrate; the base of the leaf rounded or wedge shaped. *Sinuses:* rounded and extending hardly more than a third way in to the midrib. Green above, whitish underneath; the veins pubescent on the under side. *Flowers:* crimson; showy; growing on short pedicels in drooping, sessile, umbel-like clusters which grow from lateral buds, and appear some time before the leaves. The staminate and pistillate flowers grow in separate clusters and usually on different trees. *Fruit:* bright red; growing on lengthened pedicels with wings hardly an inch long and slightly incurved; glabrous.

Who is it that can tell when the spring awakes,—when the first sign of life is disclosed by the earth? And how has he who perhaps tells us found it out? Has he followed the honey bee from his lurking place, as through a dreary landscape he seeks the swelling blossoms; or has he been led by the rabbit



Ácer rúbrum.

with his eager desire to gnaw the red maples' buds? It is indeed the insects and animals that know best; for their search is not that of the dilettante. Their desire for food impels them to look about diligently, and when found they wish to carry it to their young also. Often before the snow is off the ground the sap of the red maple begins to ascend; and in earliest March, while the odour of winter's pageant is still in the air, the flower-buds begin to expand. Then it is not long before they unfold their exquisite blossoms which hang in the bare trees like a shower of crimson light. As we wander by the side of a stream, straining our eyes perhaps for the first sight of the white violet, they may be swaying over our heads. Hardly a leaf is to be seen on the trees thus early in the year; but the soil is soft and oozy, and we scent that the winter has passed.

The red maple is undoubtedly one of the most beautiful trees of the American forest. As in the spring, the tree is in advance of others in the autumn, when it changes its hue to varied tints of scarlet and orange. In brilliancy there is none other to compare with it. During the winter its twigs are of a deeper shade of red than at other seasons of the year.

The wood of the red maple is reddish brown and hard. Furniture is made from it, and it is especially desirable when running through it is found a curly grain. From the bark a dye has been extracted and used by the Indians. Ink also has been made from it.

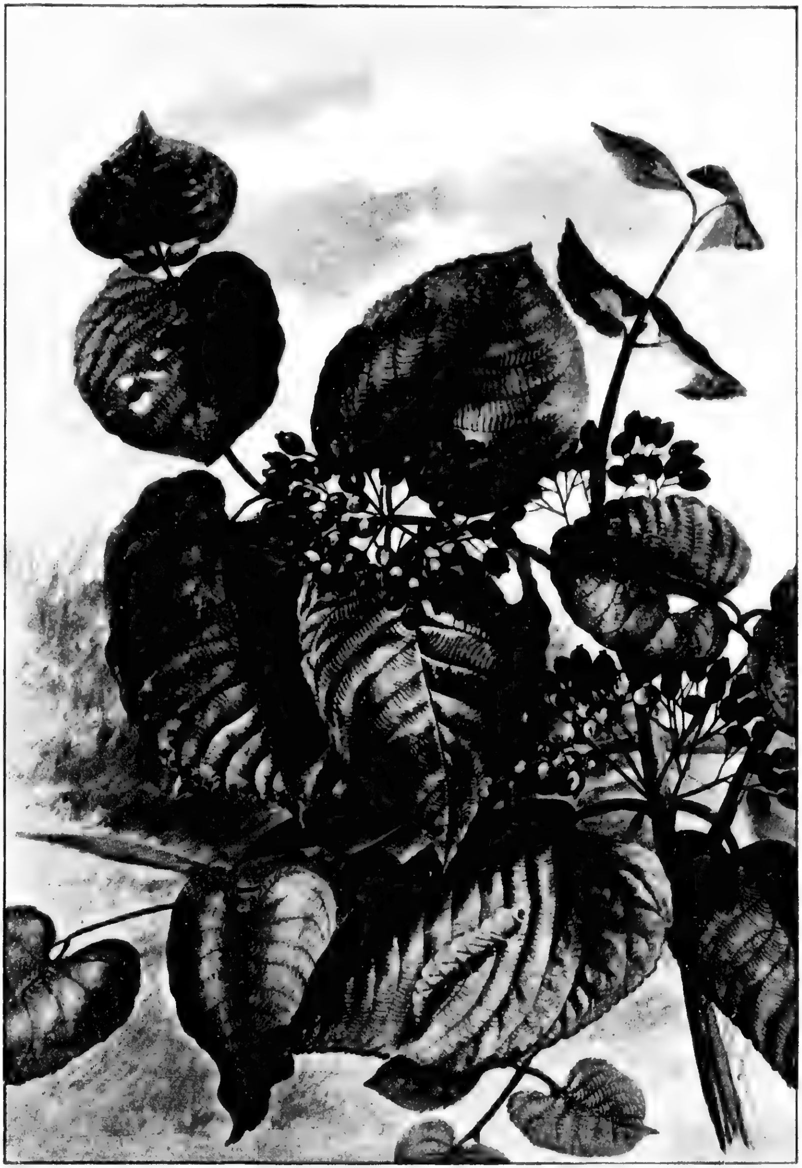


PLATE XXXIV. HOBBLE-BUSH. *Viburnum alnifolium.*

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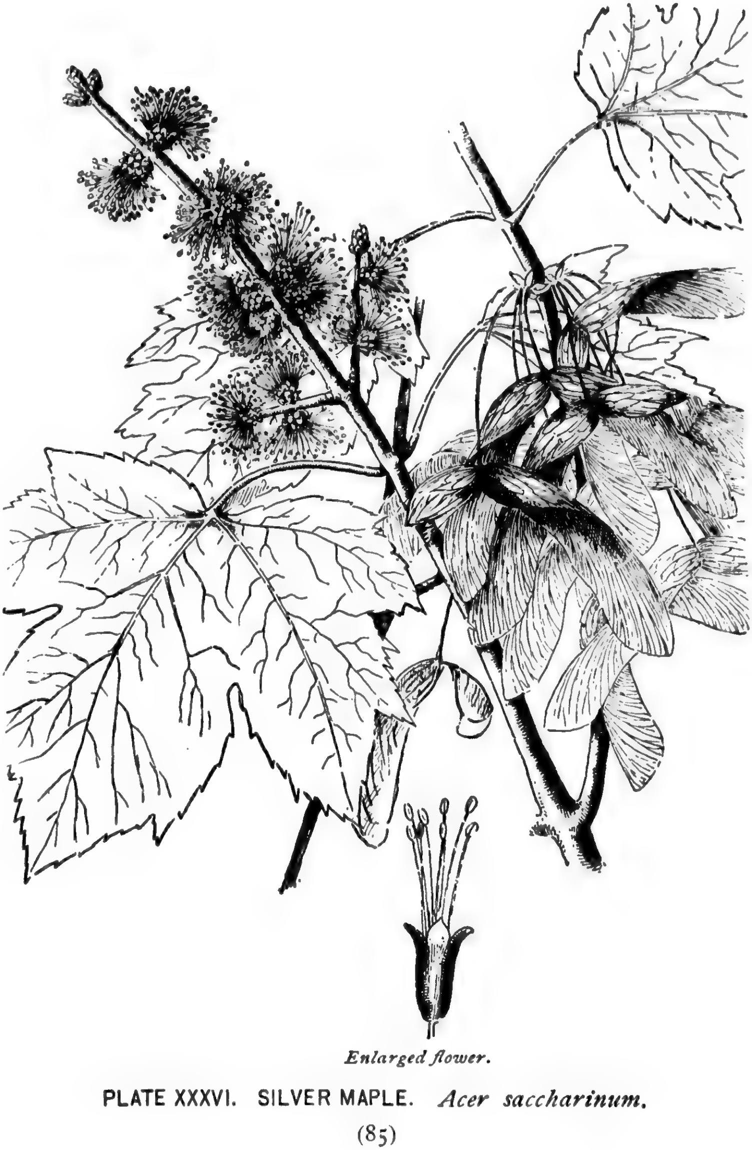


Enlarged flower.

PLATE XXXVI. SILVER MAPLE. *Acer saccharinum.*

SILVER MAPLE. WHITE MAPLE. SOFT MAPLE.

(*Plate XXXVI.*)

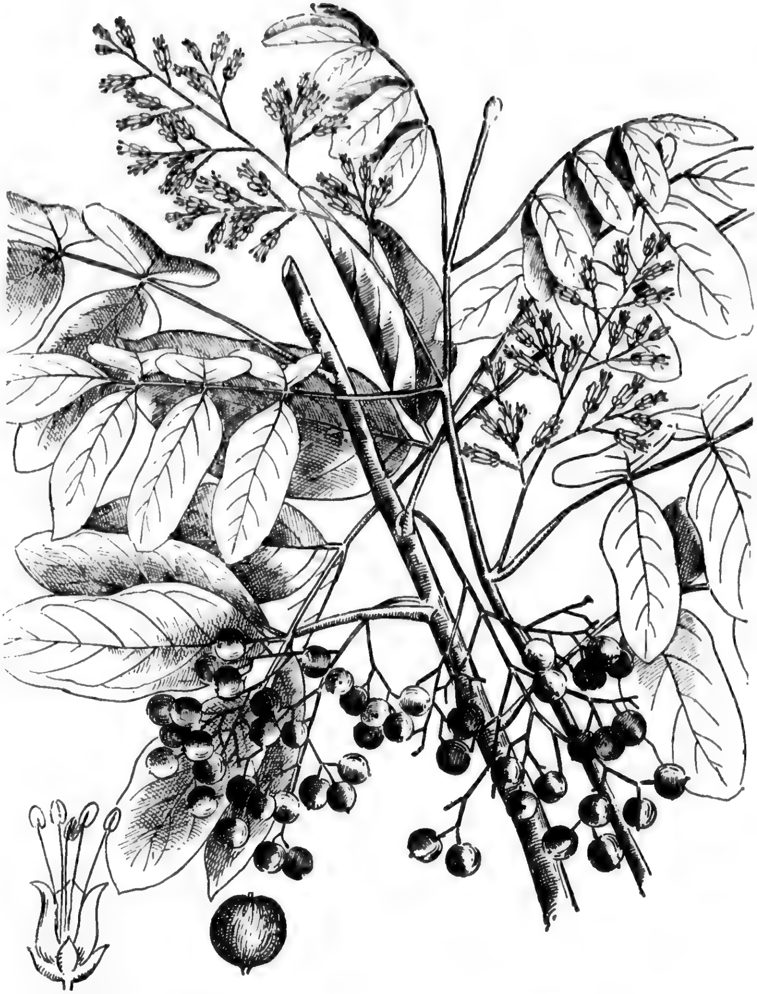
Ácer sacchárinum.

FAMILY.	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Maple.	*Branches, pendulous or wide-spreading.*	30-120 *feet.*	*New Brunswick to Fla. and westward.*	*March, April.* *Fruit: May, June.*

Bark: reddish brown; flaky. *Leaves:* simple; opposite; with long petioles; rounded in outline and having five lobes; equally notched and toothed; the lower two smaller than the other three. Base of leaf, square or heart-shaped; apex of lobes, pointed. *Sinuses:* narrow; pointed. Brilliant pale green above, silvery white beneath. Pubescent when young, becoming glabrous; thin. *Flowers:* small; yellowish green; without petals; growing on pedicels in almost sessile corymbs from lateral buds and appearing before the leaves. Pistillate and staminate blossoms growing in separate clusters on the same or different trees. *Fruit:* yellowish green, samaras growing on long, drooping pedicels; glabrous at maturity. *Wings:* large; one frequently undeveloped.

Ácer sacchárinum.

About the leaf of the white maple there is something very beautiful. Its lines are so sharply cut, and it is so free from the least approach to stiffness. It shows rather the crispness of line that artists are always endeavouring to throw into their pictures. The texture of the leaf is fine, too, and pleasing. Through the silver lining run the pale yellow veins, and the colour effect is most æsthetic. It seems as though the singing of the breezes through these trees must be more classic and captivating than when it rushes through those that are more coarsely formed. The flowers are exquisite, and in earliest spring the trees, when seen from a distance, appear to be tipped with scarlet. In cultivation the tree is very general, as its beauty and rapid growth make it desirable for shade. Unfortunately, through the brittleness of its branches, it is often



Enlarged pistillate flower.

Enlarged fruit.

PLATE XXXVII. POISON SUMAC. *Rhus Vernix.*

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bad. Some of its properties are of considerable medicinal value. The juice also can be used as a black, lustrous varnish similar to that furnished by the related Japanese lacquer tree. The poison sumac is almost exclusively found in swamps.

SWAMP HICKORY. BITTER-NUT. (*Plate XXXVIII.*)

Hicòria minima.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Walnut.	*Head, broad; branches, upright.*	50-75-100 *feet.*	*Maine westward and southward to Fla. and Texas.*	*May, June. Fruit: Sept., Oct.*

Bark: bright reddish brown; broken into thin, close, flake-like scales. *Leaves:* compound; alternate; odd-pinnate; with slender, sometimes flattened stalks and having from five to nine sessile leaflets; lanceolate; pointed at the apex and pointed or blunt at the base; sharply and coarsely serrate; glabrous on both sides or very sparingly pubescent underneath. Dark yellow green above, lighter below. *Staminate catkins:* growing in threes on slender peduncles and having lanceolate bracts; pubescent. *Pistillate flowers:* covered with a yellow tomentum. *Fruit:* with a dark green, rounded husk; soft and thin, with winged edges and splitting when ripe half way to the middle. *Nut:* whitish; broader than long; thin-shelled; depressed at the top. *Kernel:* very bitter.

By the swamp borders or in the low, wet woods of many localities this noble tree is plentiful. Its range extends farther northward than that of any other one of the hickories, and it is abundant in Canada. Its rapid growth and broad, shapely head also make it a desirable feature in cultivation. But its fruit is much better to look upon than it is to eat; it is indeed a "bitter-nut." From the accompanying illustration an idea of the exquisite colouring of its foliage can be gained, and it is interesting to know that it owes its sunny tint to many small, golden glands that lie on the under surface of the leaflets.

Commercially Hicoria minima is less valuable than is general with those of its genus. Ox-yokes and hoops are, however, made from its pliable wood, and on the hearth it feeds a quick-snapping, lively flame.

WATER HICKORY. SWAMP HICKORY. BITTER PECAN. (*Plate XXXIX.*)

Hicòria aquática.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Walnut.	*Head, narrow; branches, upright.*	40-100 *feet.*	*Va. to Fla. and Texas.*	*March, April.* *Fruit: Sept., Oct.*

Bark: light reddish brown; rough and having scales. *Buds:* reddish brown; flattened, the terminal one very large. *Leaves:* compound; alternate; odd-pinnate, with from seven to eleven ovate-lanceolate leaflets pointed at the apex and rounded or wedge-shaped at the base; serrate; dark green above, brown and lustrous below and pubescent. *Staminate flowers:* growing in long, slender catkins and produced from separate or leaf-bearing buds. *Pistillate flowers:* oblong and covered with pubescence. *Fruit:* growing in clusters of a few, with a greenish, thin husk which splits into four sections. *Nut:* darkly-coloured; four-angled; rough and flattened, and having a thin shell. *Kernel:* bitter; puckery to the taste.

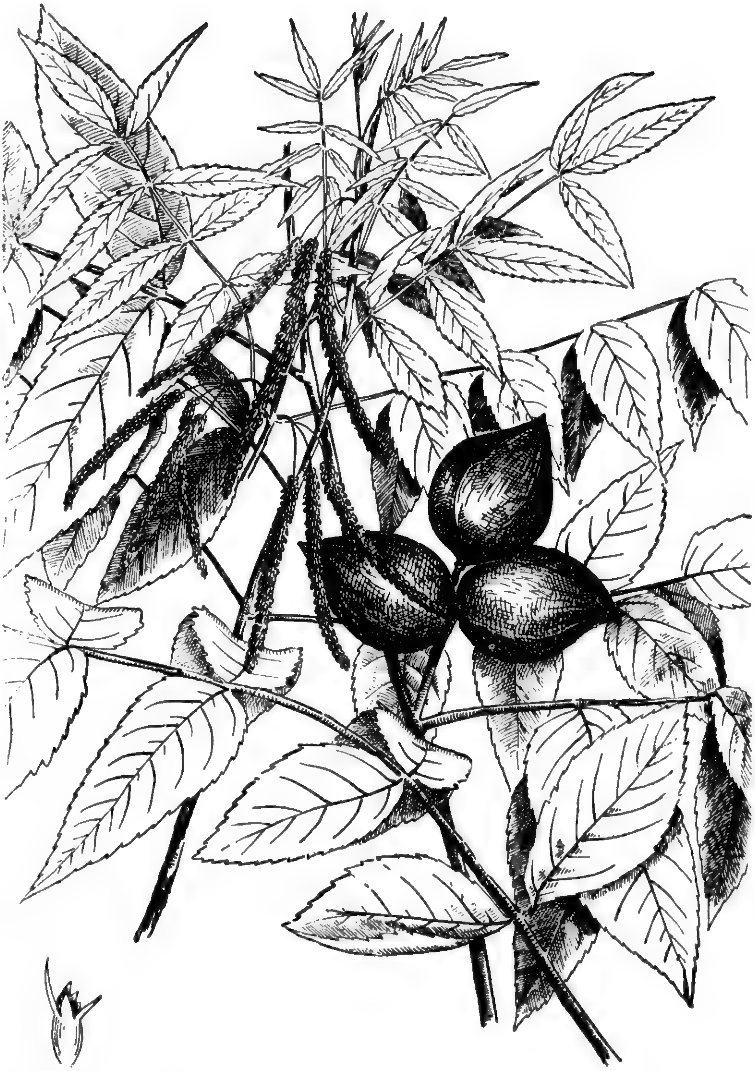
Away from the swamps this tree is seldom seen growing in the full prime of its beauty, but when there, even although it is a small tree, it has about it the same picturesqueness and freshness that is associated with the genus. Its fondness truly is for low country. Often the river swamps in which it seeks its home are inundated during part of the year, and for this reason it is difficult of access when its timber is desired. It would seem, however, as though the commercial instinct might be sacrificed rather than take it away from places to which it adds so sylvan a charm, especially as its dark brown wood is of less value than that of any other one of the hickories. Although closely grained and compact it is very brittle and is used for little else than fuel and fences. Once having seen the fruit of the tree it cannot readily be mistaken; for the dusky, flattened and rough shell is very distinctive.

ASH-LEAVED MAPLE. BOX ELDER. (*Plate XL.*)

Àcer Negúndo.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Maple.	*Wide-spreading.*	20-50 *feet, or higher.*	*Vermont and Penn. southward and westward.*	*April.* *Fruit: June.*

Bark of *branchlets:* greenish brown; ridged. *Twigs:* pea-green. *Leaves:* compound; opposite, with long, slender stalks; odd-pinnate, with three, five



Pistillate flower.

PLATE XXXIX. WATER HICKORY. *Hicoria aquatica.*

or rarely seven ovate leaflets; taper-pointed at the apex and pointed, rounded or wedged-shaped at the base; coarsely and remotely toothed, often entire at the base; deep green above, pale underneath. *Ribs:* distinct; slightly pubescent. *Flowers:* yellowish green; diœcious; apetalous; small; growing from the sides of the branches in drooping clusters and appearing before the leaves. The fertile ones in racemes of from six to eight inches long. *Samaras:* Large; yellowish green; the double wings, veiny.

Àcer negúndo.

The box elder is a rather mysterious character and has much to answer for in the way it has puzzled the minds of botanists and earnest-thinking people. In manner of growth its foliage has suggested to some the elders, and again it has been thought to be connected with the ashes. Its fruit, however, shows conclusively that it belongs to the maples. In spite of this tendency to conciliate all, although we should give it the benefit of the doubt and think that it has been trying always to imitate the best, it is a handsome tree of free and rapid growth. For the ornamentation of parks or gardens it is well adapted, as its foliage is a lively, brilliant green, and it is able to resist long droughts. Unfortunately it is not regarded as being very long-lived.

The wood of the ash-leaved maple is creamy white and not strong. From it an inferior sort of furniture is made. In small quantities the bark yields maple sugar. To the tree is attached the distinction of having been one of the first of the North American ones that were known in Europe.

BLACK ASH. HOOP ASH. WATER ASH. (*Plate XLI.*)

Fráxinus nìgra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Olive.	*Head, narrow, slender; branches, upright.*	30-80 *feet, or higher.*	*New Foundland westward, southward to Fla. and Ark.*	*April, May. Fruit: July.*

Bark: dark, tinged with grey; rough and broken into irregular plates, becoming smooth in the branches which are marked with white, wart-like dots.

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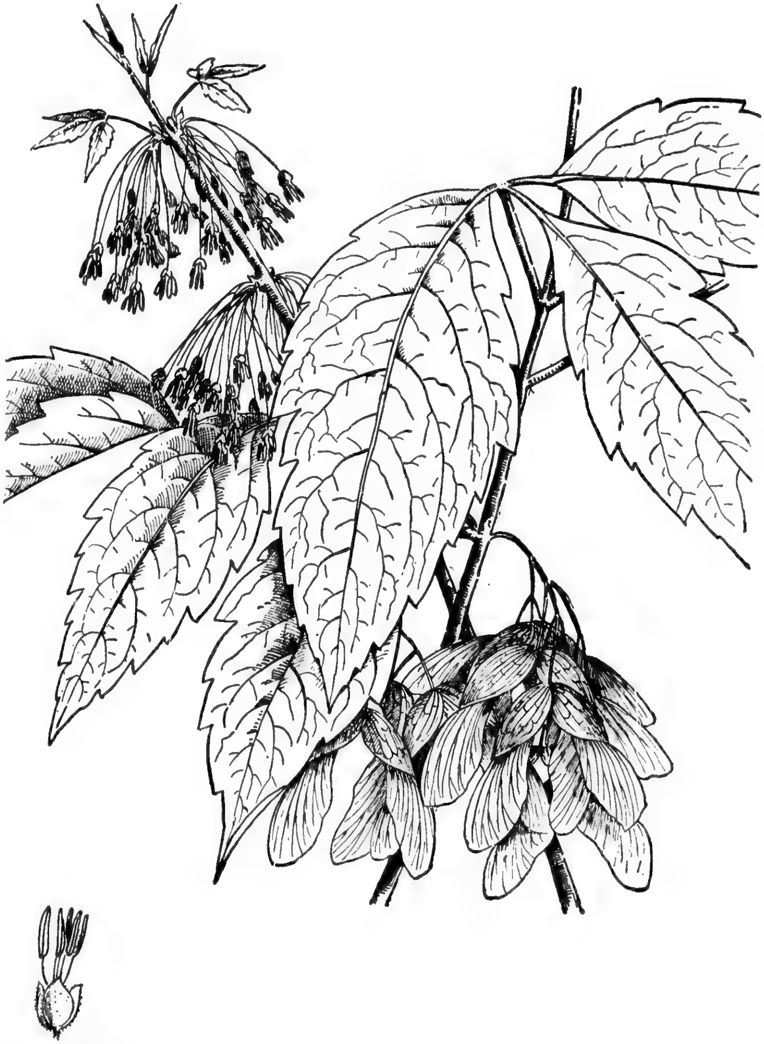


Enlarged flower.

PLATE XL. ASH-LEAVED MAPLE. *Acer negundo.*

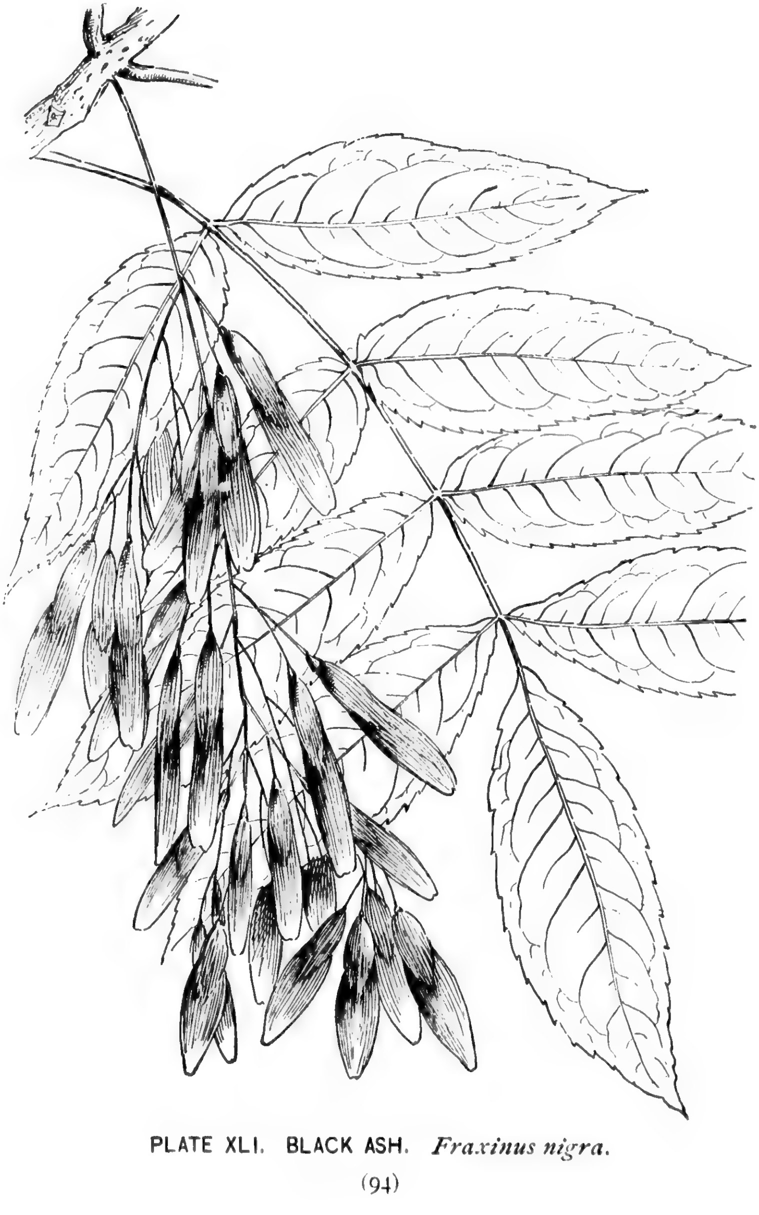


PLATE XLI. BLACK ASH. *Fraxinus nigra.*

Leaf-Buds: bluish black. *Leaves:* twelve to sixteen inches long; compound; opposite; odd-pinnate; having grooved stalks with from seven to eleven broadly lanceolate, sessile leaflets, taper-pointed at the apex, and narrowed or rounded at the base; sharply and irregularly serrate; deep green and glabrous on the upper side; paler below and slightly pubescent along the whitish ribs. *Flowers:* diœcious; growing in long panicles and appearing before the leaves. *Samaras:* oblong; blunt at both ends; winged all around.

As early as March we may begin to look about for the blue-black buds of the black ash. They seem not to mind about encountering the cold, and the tree is found farther northward than any other one of the American ashes. In the swamps it grows at times so prolifically as almost to fill in the wet ground. When taken away and transplanted it is short-lived. As soon as the first frost touches the leaves, or even earlier in the autumn, they turn a rusty brown and begin to fall. When they are crushed the odour they emit is similar to that of the elder.

The light brownish wood has a beautiful grain and is heavy although not very strong. It is used in cabinet work and extensively for the making of barrel hoops. The Indians know well the black ash and seek the pliable young saplings to use in constructing their baskets.

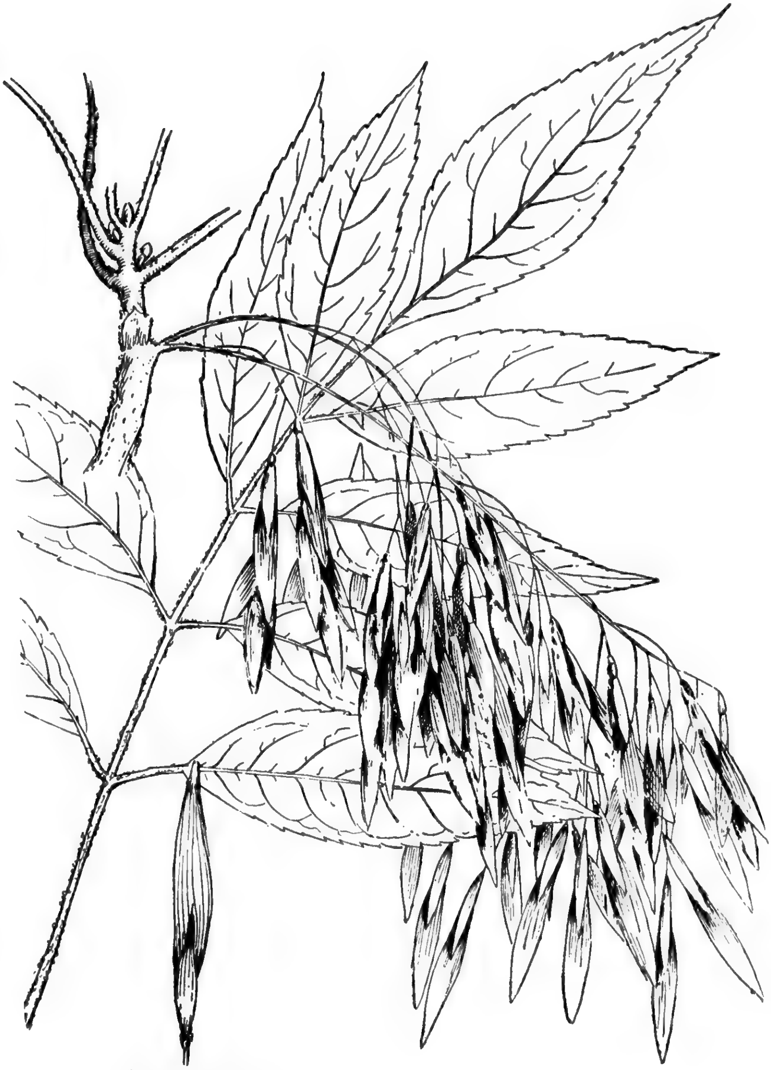
RED ASH. (*Plate XLII.*)

Fráxinus Pennsylvánica.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Olive.	*Head, irregular; branches, upright.*	30-80 *feet.*	*Atlantic states and New Brunswick to Minnesota.*	*April, May.*

Bark: brownish grey; slightly furrowed vertically and becoming smooth on the branches. Young shoots and leaf-stalks conspicuous for their pubescent, rusty down. *Leaves:* ten to twelve inches long; compound; opposite; odd-pinnate; with grooved, pubescent stalks and from five to nine long ovate or lanceolate leaflets, which have downy petiolules hardly one quarter of an inch long. Apex, taper-pointed; base, pointed. *Edge:* entire or sparingly serrate towards the apex. Light green above, paler on the under side and becoming reddish. When unfolding, covered with a white tomentum. *Flowers:* diœcious; growing in compact panicles; without petals. *Samaras:* from one to two and a half inches long; broadly linear or oblanceolate, the wing rounded or bluntly tipped at the apex. They remain on the branches over the winter.

The red ash is so called because the inner surface of the outer bark of the branches is a light red, and the down that



Single samara.

PLATE XLII. RED ASH. *Fraxinus Pennsylvanica.*

appears on the branches is also a ruddy, rich shade. The former one of these peculiarities is a feature shared by the white ash which commercially is a more valuable tree. In the autumn the leaves of the red ash turn yellow, or brown and yellow, before falling. When the question of an ash's identity is to be settled, it should be remembered that the trees are both staminate and pistillate; and it is only on the latter ones that fruit will be found. The staminate trees also must be accorded their true place and not condemned as useless ones which no longer bear fruit.

GREEN ASH. (*Plate XLIII.*)

Fráxinus lanceolàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Olive.	*Round-topped; branches, spreading.*	20-65 *feet.*	*New England, southward and westward.*	*April, May.*

Bark: greyish brown; furrowed. *Branchlets:* ash coloured and marked with pale, cell-like places. *Leaves:* compound; opposite; odd-pinnate, with from five to nine ovate or lanceolate, taper-pointed leaflets which grow on smooth petiolules hardly a quarter of an inch long; sharply serrate and becoming entire towards the base. Bright green on both sides and glabrous, although occasionally downy in the angles of the ribs. *Flowers:* diœcious. *Samaras:* small; similar to those of the white ash; the wings more spatulate in outline.

Between the red ash and the green ash there is great similarity. Their flowers are identical, and the variableness of the greon ash is added to make it somewhat difficult to tell them apart, excepting in extreme forms. The green ash, however, is very nearly glabrous throughout, and it is the smaller of the two trees. Its leaves also are shorter, narrower and more sharply serrate. But it is the intense, lustrous, bright green of the foliage by which it is most commonly known. Whether the rain falls or the sun shines upon the leaves they are ever brilliantly, beautifully green. Of all the ashes it is the one most planted for ornament, and it has a rare faculty for adapting itself to new surroundings. It requires an abundance of sunlight.

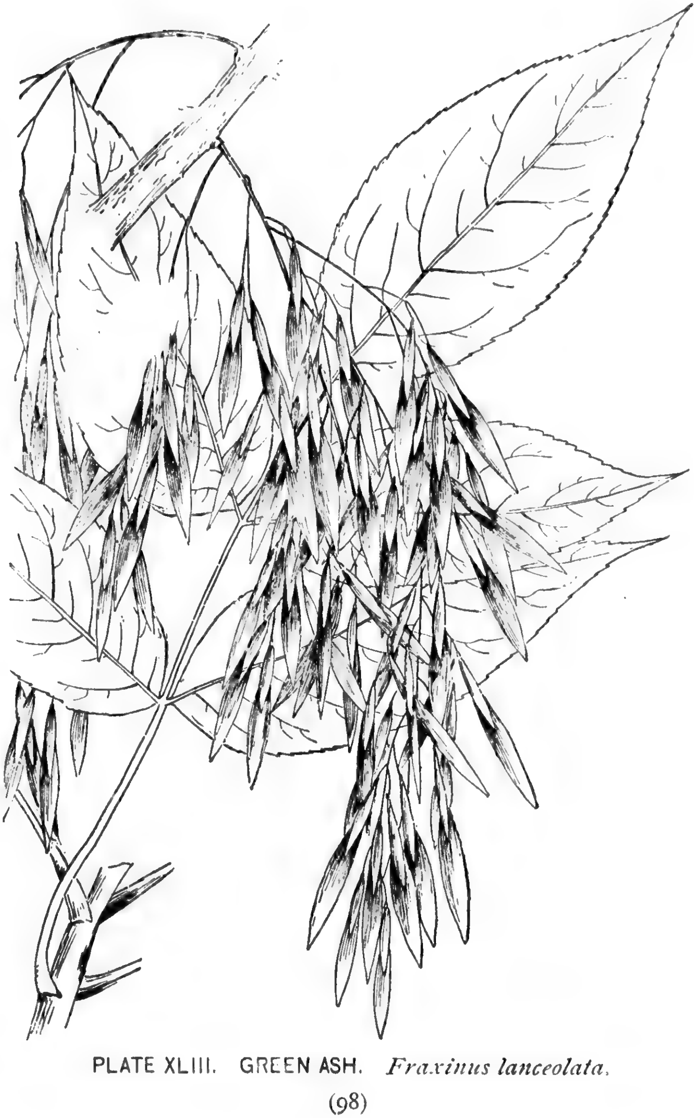


PLATE XLIII. GREEN ASH. *Fraxinus lanceolata.*

Its wood is brown and strong. It is, however, not regarded as being of much value commercially, although necessity has sometimes caused it to be used as a substitute for the wood of the white ash. This tree and the red ash, while preferring moist ground, often grow on drier soil.

> "The mountain stirr'd its bushy crown
> And, as tradition teaches,
> Young ashes pirouetted down
> Coquetting with young beeches;
> And briony-vine and ivy-wreath
> Ran forward to his rhyming,
> And from the valleys underneath
> Came little copses climbing."
>
> —TENNYSON.

BALD CYPRESS. CYPRESS. (*Plate XLIV.*)

Taxòdium distichum.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Conical; branches, spreading.*	60-150 *feet.*	*Delaware to Texas, Arkansas northward.*	*April.*

Bark: reddish brown; furrowed. *Branchlets:* slender. *Leaves:* light green; simple; growing closely in two ranks along the branches; half an inch long; needle-shaped; pointed; occurring awl-shaped and overlapping each other; deciduous. *Flowers:* monœcious; yellowish; appearing some time before the leaves. *Staminate flowers:* growing compactly in terminal, drooping panicled spikes. *Pistillate ones:* growing in rounded clusters. *Cones:* light brown; globular; the several angular scales forming a closed ball until mature.

There is a strangeness in the ways and majestic aloofness of the bald cypress. It is not as other trees. In the Atlantic and Gulf states, where it sometimes forms extensive forests, few can enter without feeling a desire to know its history. It is ingenious too. That it may prevent the escape of moisture and resist the violence of autumnal gales, is thought to be the reason that its leaves, which may have been slender and spread out from the branches, sometimes become close and scale-like. At the time of pollenation, when it is shedding its golden dust, and with its leaves in various positions, it is represented by the illustration.

But more interesting than all else about the tree are the so-called cypress knees, a feature that has baffled the theories and explanations of many. Dr. Charles Mohr, who has studied the subject most profoundly and is an authority on the formation and usefulness of these knees, has been most kind in contributing the following account of them to "A Guide to the Trees." In his letter he says: "The following information has been taken as concisely as possible from the statements made in the manuscript of my monograph on Taxodium distichum and transmitted to the Forestry division of the United States department of Agriculture.

"The pyramidal or conical excrescences of the roots of the cypress known as cypress knees and which form such a striking peculiarity of the trees are always produced under water, or in a constantly water-soaked soil. They are produced often in great number within a radius of from twenty-five to forty feet or more from the trunk, varying from two to six feet and more in height, and always rise above the water. They are simple or with several tumid divisions and normally bare of leaf-bearing sprouts. In the trees approaching their fuller growth they are most frequently hollow, perfectly smooth on the inside of the shell, with its wood compact and firm.

"The opinion about the uses these knees serve in the household of the tree is divided, and their import to its life is not yet perfectly understood. On one side, it is contended that their purpose is purely mechanical, to serve the tree as an additional means for the support of the enormous weight of the tree in the loose ground, and to increase its resistance to the strain to which it is subjected under the pressure of heavy winds. On a close study of the root system below ordinary water mark, accidentally laid bare, the conclusion can scarcely be avoided that the function of the knees is chiefly mechanical. As an acute observer states, 'to strengthen the roots that the tree may anchor itself safely in a yielding soil, acting as trusses to increase their capacity for holding the tree firmly to

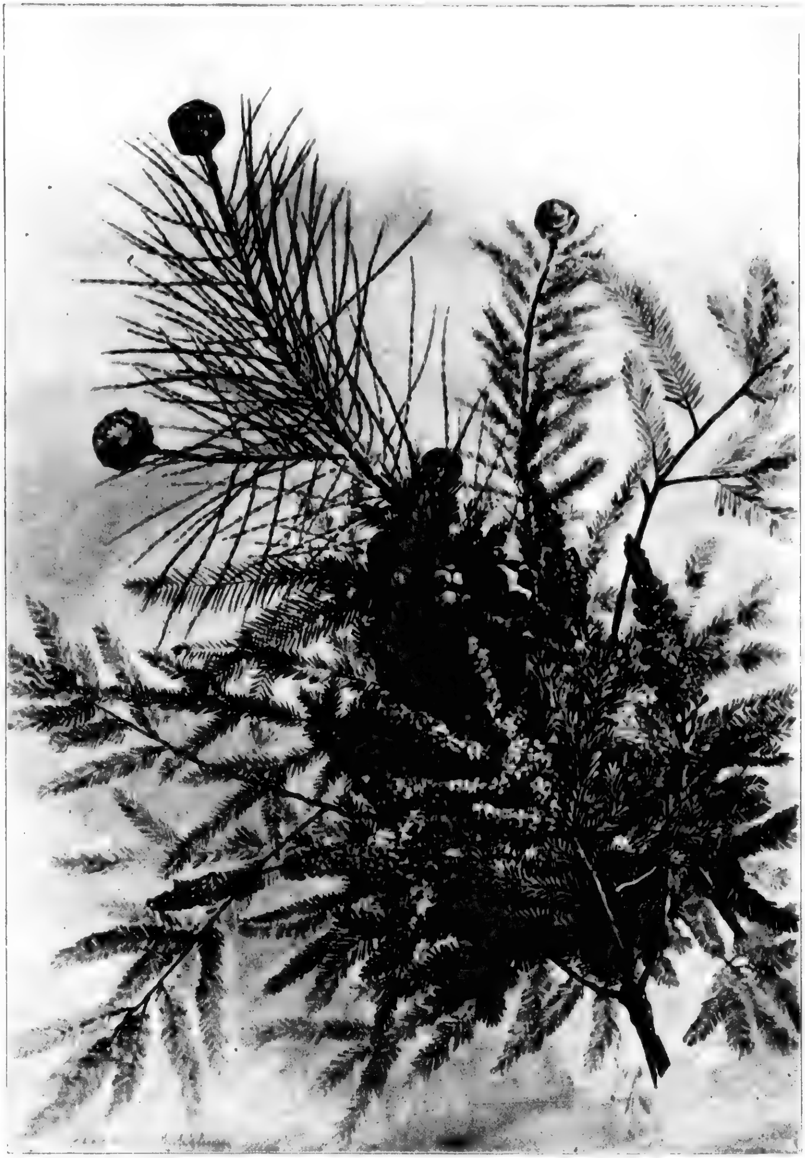


PLATE XLIV. BALD CYPRESS. *Taxodium distichum.*

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the soil.' This opinion finds confirmation in the fact that scarcely any other tree of our forests offers a greater resistance to the force of storms under the most unfavourable soil conditions.

"On the other hand it is held that the function of the knees is principally physiological by acting as organs of aëration. The exposed parts of the knees effect the absorption, and by their chlorophyll-bearing tissue, the partial decomposition of atmospheric gases under the influence of light, and their transmission to the sap of the roots, promote the process of assimilation in parts of the tree debarred from a sufficient supply of the same.

"With the decay of the tree, the knees rot and finally disappear; the same is said to take place after the drainage of the swamp. Not being needed they are not present in the trees grown on high land.

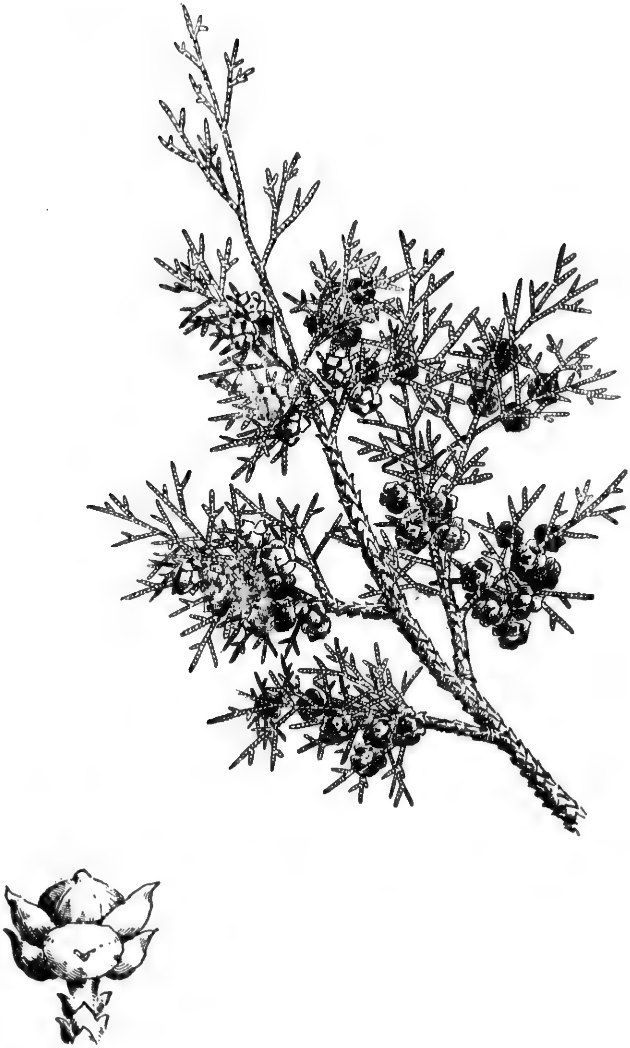
"From the fact that the knees serve the tree mechanically by increasing the force of the tree to maintain its foothold in a yielding ground and that further by their physiological function the processes involved in its nutrition and growth are promoted, it appears clearly that in the peculiar development of the root system the cypress possesses the means of adapting itself perfectly to the conditions of its immediate surroundings."

SOUTHERN WHITE CEDAR. (*Plate XLV.*)

Chamæcyparis thyoides.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Spire-like; branches, horizontal.*	30–90 *feet.*	*Atlantic seaboard and Gulf states to Miss.*	*April, May.*

Bark: light reddish brown; very fibrous; separating into loose scales. *Branchlets:* brown, their thin bark also separating. *Leaves:* tiny; simple; ovate and awl-shaped; overlapping each other like scales and growing closely together in rows of four, up and down the branchlets. Dull brownish or blue-green; glaucous. *Cones:* hardly one-half an inch wide; globose; sessile on leafy branches; purplish at maturity; glaucous, and opening towards the centre when ripe, *not towards the base.* *Scales:* thick; several-pointed and as though



Enlarged bud.

PLATE XLV. SOUTHERN WHITE CEDAR. *Chamæcyparis thyoides.*

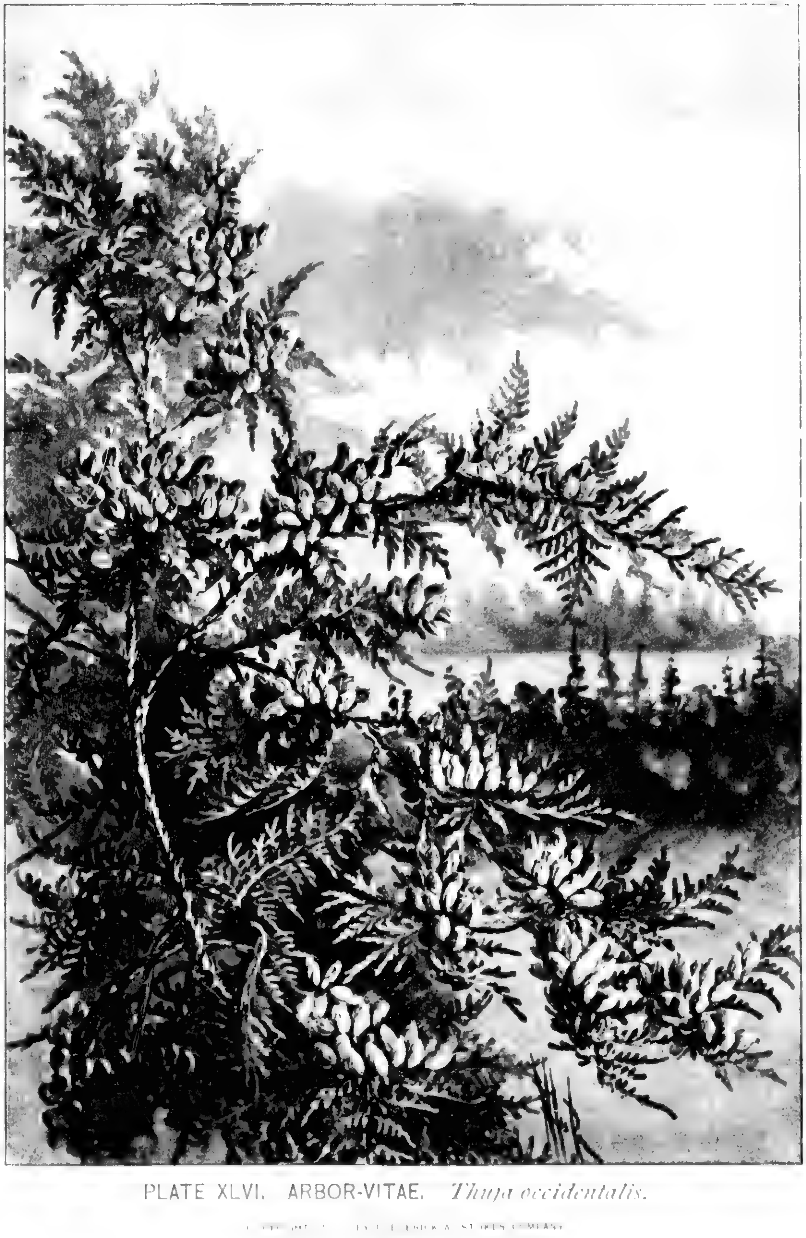


PLATE XLVI. ARBOR-VITAE. *Thuja occidentalis.*

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fastened at their centres. ***Seeds*** **: one or two under each fertile scale; oval; winged at the sides.**

In the fulness of Nature's heart she has provided this beautiful and fragrant tree to flourish abundantly in places where other useful timber trees are very chary of establishing themselves. It grows in deep, cold swamps which are frequently immersed during several months of the year. In New England and the Middle States it is not as well-known as it is throughout its more southern range. The deeply tinted little cones which it develops are a pretty sight as they jauntily sit among the blue-green foliage: and the symmetrical figure of the tree makes a clearly cut and distinctive feature on the landscape.

Chamæcýparis thyoìdes.

In the south the wood of the tree is used in ship-building. It is slightly fragrant, light-coloured and most durable when in contact with the soil. The fact that it is soft and easily worked makes it desirable for many purposes.

ARBOR VITÆ. WHITE CEDAR. (*Plate XLVI.*)

Thùja occidentàlis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Conical; branches, pendulous.*	20-65 *feet.*	*North Carolina northward into Canada, and westward.*	*April, May.*

Bark : greyish brown; tinged with orange or red, and separated into narrow, deciduous strips. *Leaves :* simple; opposite; blunt; scale-like and overlapping each other as they grow closely together on branchlets that are very flat. Bright green; aromatic; especially so when bruised. *Cones :* tiny; yellowish brown; ovate; nodding and opening to the base when ripe. *Scales :* six to ten; oblong; without points; smooth. *Seeds :* one or two, with thin broad wings notched at the apex.

This very formal and prim appearing tree has for a long time been extensively planted. In fact it was probably the first

North American tree to be known in Europe and has been cultivated in Paris since before the middle of the XVIth century. It forms an excellent hedge. When under the gardener's care it is very prone to vary and produce new varieties, but it can hardly be said to become more beautiful than when in its wild state. The extremes of climate affect it very little. In America it becomes smaller and grows less abundantly as it reaches the limits of its southern range. Northward it covers large areas of swamp land, and the forests that it forms are almost impenetrable. As of all coniferous trees, its fruit is interesting. The tiny cones remain on the branches over the winter to greet the new growth in the springtime. This is an act of pure courtesy on their part, as during the preceding autumn they have finished their own work and ripened and scattered their seeds.

Speaking of this tree, Thoreau says: "How little I know of that arbor vitæ when I have heard only what science can tell me. It is but a word, it is not a tree of life. But there are twenty words for the tree and its different parts which the Indian gave, which are not in our botanies, which imply a more practical and vital science. He used it every day. He was well acquainted with its wood, its bark and its leaves. No science does more than arrange what knowledge we have of any class of objects. But, generally speaking, how much more conversant was the Indian with any wild animal or plant than we, and in his language is implied all that intimacy, as much as ours is expressed in our language."

It is true the Indians had many uses for the fragrant, yellowish brown wood of the tree. They separated its thick layer of sapwood, as they could do with ease, and with it strengthened their canoes. They also used parts of it in the making of their baskets. Fluids of medicinal value are yielded by the tree, and they have some local popularity for the curing of warts. The fresh young branches are used to make brooms.

AMERICAN LARCH. TAMARACK. HACKMATACK.

(*Plate XLVII.*)

Làrix laricína.

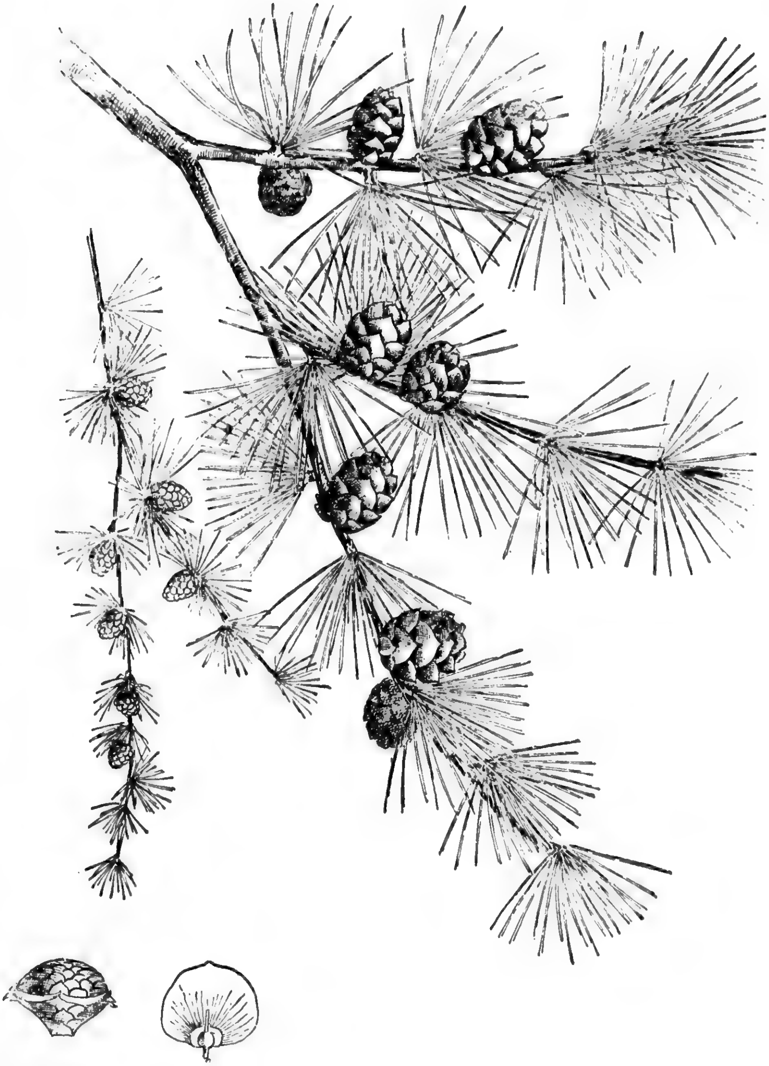
FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Tall, straight; branches, spreading.*	50-100 *feet.*	*Northern Ill. to N. E., northward to New Foundland.*	*May.*

Bark: close, becoming scaly. *Leaves:* less than three quarters of an inch or two inches long; simple; thread-like; growing in bunches of many on short twigs along the branches and having no sheaths; pale green; soft; delicate; they wither and fall in the autumn. *Cones:* about half an inch long; broadly ovate; growing on short peduncles at the ends of the branches; greenish when young, and becoming purplish or brown at maturity. *Seeds:* few; rounded; thin; entire.

> "Give me of your roots, O Tamarack!
> Of your fibrous roots, O Larch-Tree!
> My canoe to bind together,
> So to bind the ends together
> That the water may not enter,
> That the river may not wet me!
> And the Larch with all its fibres,
> Shivered in the air of morning,
> Touched his forehead with its tassels,
> Said, with one long sigh of sorrow,
> Take them all, O Hiawatha!"

How beautifully has Longfellow depicted the Indian as one in sympathy with nature. When Hiawatha began to build his canoe, he went to all the trees that he knew has such materials as were necessary to him, and said, "Give me—"; and although it should have caused their death, they answered, "Take, O H watha!" Here was no ruthless tearing away of life without permission; it was the tribute of a man's understanding to these mute inhabitants of the forest.

Làrix laricína.



Staminate flower *Scale of cone.*

PLATE XLVII. AMERICAN LARCH. *Larix laricina.*

(106)

Although they have no souls, life must still be sweet to them.

The American larch with its soft, fine foliage is one of our most graceful trees. In the early spring its flowers peep out, much before the leaves; they grow from broad lateral buds, and although the sterile ones are yellow the fertile ones are a brilliant crimson. The light brown wood of the tree is resinous and very durable. Its more practical uses than those already referred to are in the making of railroad ties and various parts of ships.

L. Europæa is a relative of the American tree which is frequently seen in cultivation. It is of rapid and fine growth and very ornamental. Perhaps its colour is a deeper shade of green than that of the native one, and its leaves are a trifle longer. Its branches appear to droop more, and its cones too are longer and have many more scales. There is a weeping form of the European larch which is also known in cultivation.

Trees Preferring to Grow in Moist Soil: Lowlands and Meadows.

All about the soil was moist and traversing it was a road that had become hard and dry. On either side of the road grew trees. They were water trees that had strayed away from home. In the distance trailed a sluggish stream. Did the trees long for it? The ones on the farther side of the road inclined over it so that a squirrel could hardly sit upright under them; and those on the side nearest the water leaned away from the road until they continually broke down its hard bank. It was a strange scene through which to travel.

In the lowlands, away from the streams and swamps, there are many trees; but they are mostly contented with their lot, and not so unhappy as those by the road.

UMBRELLA-TREE. ELK-WOOD. (*Plate XLVIII.*)

Magnòlia tripétala.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Magnolia.	*Bushy.*	20-40 *feet.*	*Southeastern Penn. to Ala.; westward to Ark. and Miss.*	*May, June.*

Bark: light grey; smooth; marked with small dots similar to blisters. *Branches:* green; turning brown and grey as they grow older; brittle. *Juice:* fragrant; bitter. *Leaves:* simple; alternate; ovate-lanceolate; with short, stout petioles and growing in clusters at the ends of the branches; pointed at the apex and tapering to a point at the base; entire; bright green; the lower surface covered with a thick tomentum at maturity; glabrous. *Flowers:* seven and eight inches in diameter; cream-white; growing at the ends of the branches. *Sepals:* light green; obovate; reflexed; thin. *Petals:* six to nine; narrow and concave. *Filaments:* bright purple. *Cone* of *fruit:* ovoid; rose coloured at maturity.

A glance at this tree either when it is in bloom or in fruit is enough to assure us that it is a magnolia. Clustered about it

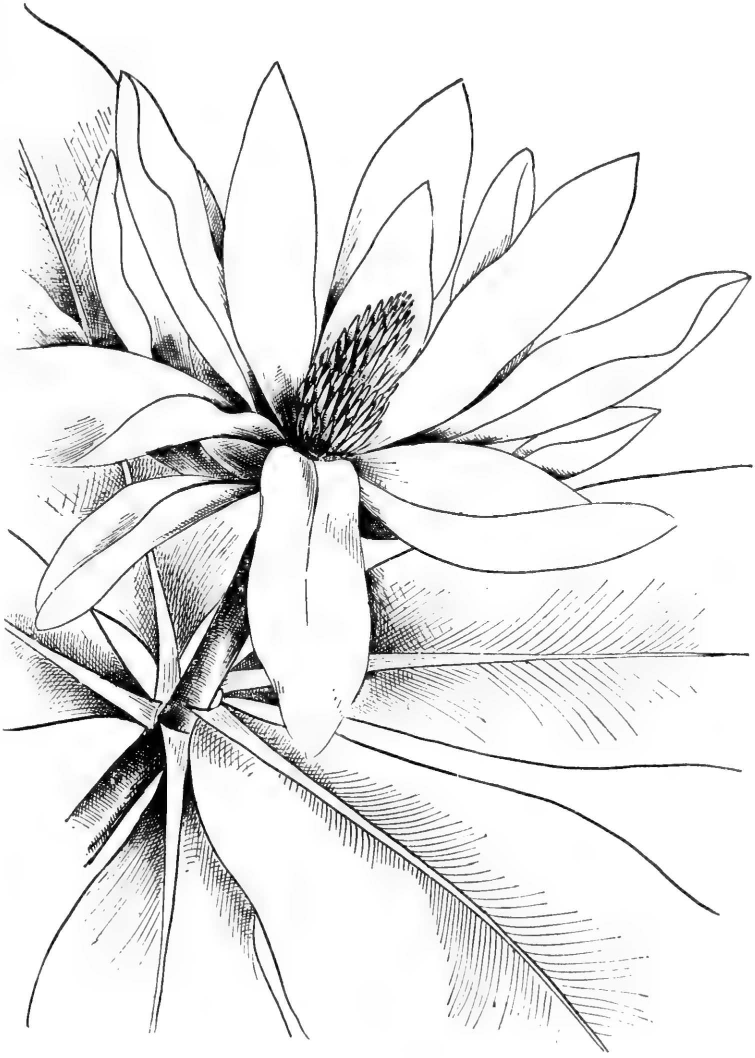


PLATE XLVIII. UMBRELLA-TREE. *Magnolia tripetala.*

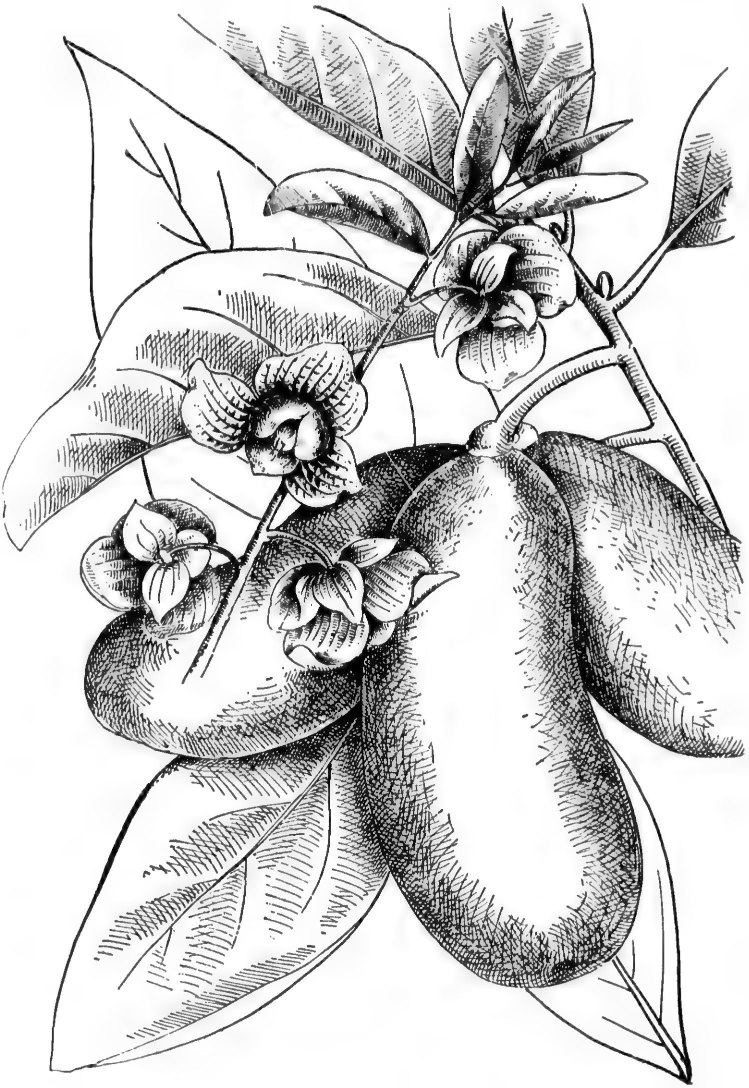


PLATE XLIX. NORTH AMERICAN PAPAW. *Asimina triloba.*

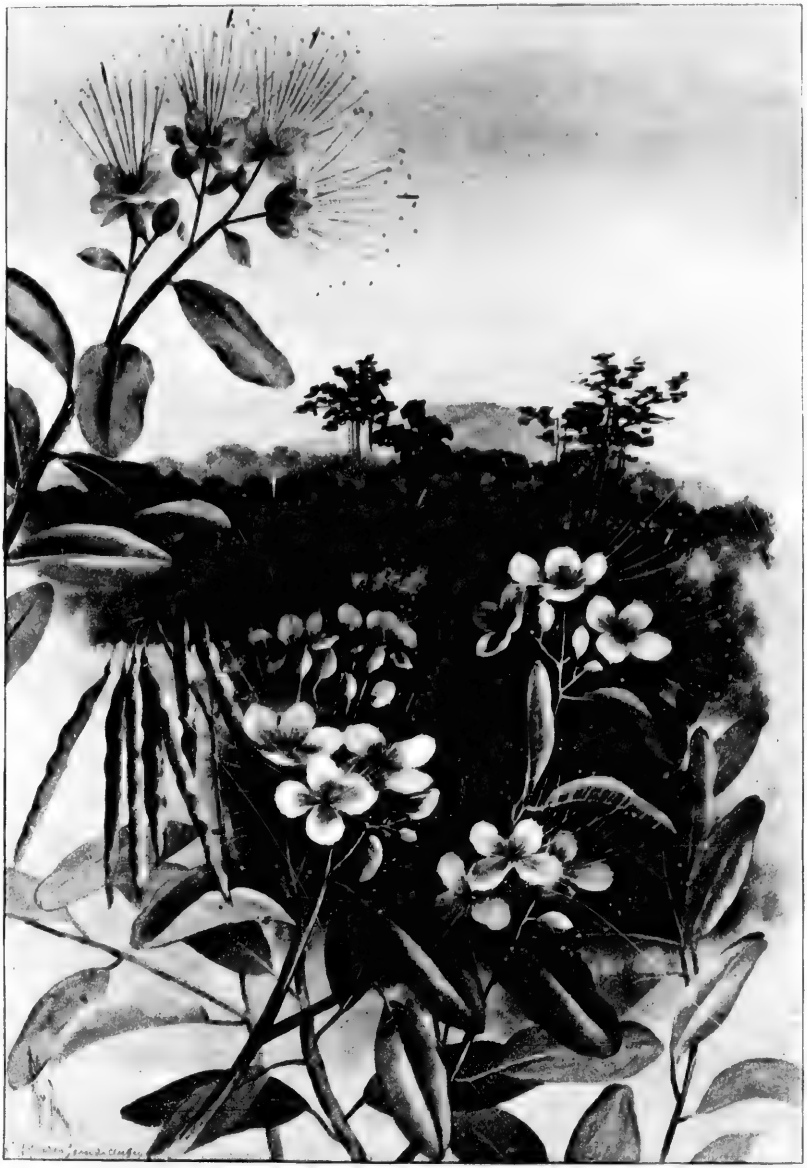


PLATE L. JAMAICA CAPER TREE. *Capparis Jamaicensis.*

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are many family traditions. Although it cannot vie in beauty or outline with the great-flowered magnolia, it is far from being without its own loveliness. Among the great, lustrous leaves, which are often twenty inches long, the cylinder-shaped bunches of ruddy fruit rest perhaps even more peacefully than do the unfolding blossoms. The ribs of an umbrella are somewhat suggested by the arrangement of the leaves at the ends of the branches and it was this peculiarity which led the early settlers in Virginia and North Carolina to call it umbrella or parasol tree. Its specific name refers to its three petaloid sepals. The tree is nowhere common. It grows in rather wet, deep soil, a little inland from the great swamps, and by the borders of woods it is found intermingled with masses of rhododendron. The tree is more hardy than many others of the family, and for this reason much attention has been paid to it by horticulturists. It is the species most generally seen in the northern United States and in Europe.

NORTH AMERICAN PAPAW. CUSTARD APPLE.

(*Plate XLIX.*)

Asimina triloba.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Custard apple.	*Branches, spreading.*	10-40 *feet.*	*Penn. and western N. Y., southward to Iowa and westward.*	*May, June.* *Fruit: Sept., Oct.*

Bark: dark brown; marked with silvery blotches; smooth. *Branchlets:* light brown, fringed with red and marked with narrow, parallel grooves. *Leaves:* five to ten inches long; simple; alternate; with pubescent petioles; obovate-lanceolate, with pointed or slightly rounded apex and taper-pointed or rounded base; entire; light green above, paler beneath and covered on the lower surface with a rusty down; glabrous at maturity; thin; glossy. *Flowers:* solitary; axillary; pendulous; growing on club-shaped, pubescent peduncles and appearing with the leaves. *Sepals:* three; pubescent. *Petals:* greenish yellow, gradually turning to dull purple; six, in two rows, the inner ones small. *Stamens:* numerous; on the receptacle. *Pistils:* appearing as though enclosed in a round head formed by the anthers. *Fruit:* three to five inches long; oblong; yellow and glaucous when young, becoming dark brown when fully ripe. Fragrant; edible; sweet.

From the true papaw of the West Indies, this one is very different; and the genus is the only one of its family which is not tropical in its preference. It can hardly be said, however, to attain its full state of development in the north. It is a small tree or shrub, often only a bush, and when in full foliage appears as though it were weighted down with the abundance of its large, shining leaves. In the valley of the Mississippi the tree is very common, and about that district its fruit is sent in large quantities to the markets. Before it is fully ripe it emits, as do the other parts of the tree, a peculiar and disagreeable odour.

The papaw is a cautious little character and mistrusts the vagaries of the wind. To perform the office of cross-fertilization it relies with greater faith on the insects, for they can assuredly be attracted by their appetites. At the base of the inner petals, therefore, the flowers secrete abundant nectar. The stamens are raised in a hemispherical mass from the centre of the bell-shaped flowers, and from it the stigmas protrude. As the insect squeezes his body through the small opening between the stamens and the inner petals in search of the feast, he is, no doubt, quite unconscious that the stigmas are eagerly taking from him the golden pollen which he has attracted at his last stopping place.

JAMAICA CAPER TREE. (*Plate L.*)

Cápparis Jamaicénsis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Caper.	*Trunk, straight, slender.*	18-20 *feet.*	*Southern Florida.*	*April, May.*

Bark: dark reddish brown; irregularly broken. *Branchlets:* angular. *Leaves:* simple; alternate; oblong-lanceolate or elliptical; growing on petioles about a quarter of an inch long; rounded and notched at the apex, rounded at the base; entire; dark yellowish green and lustrous on the upper side, paler below and rough from the presence of tiny scales; the midrib conspicuous. *Flowers:* white; fragrant; growing at the ends of the branches in a terminal cluster. *Sepals:* recurved. *Corolla:* with four rounded petals which become purple as they fade. *Stamens:* long; numerous; with purple filaments and yellow anthers. *Pods:* two to several inches long; brownish red when ripe and containing several kidney-shaped seeds.

There is an inspiration to be had from the pure, white flowers of the Jamaica caper tree, with their long filaments as delicate and misty in colouring as the threads of a spider's web. Their fragrance also seems to be quite in harmony with the warm, luxurious atmosphere upon which they lean. In the

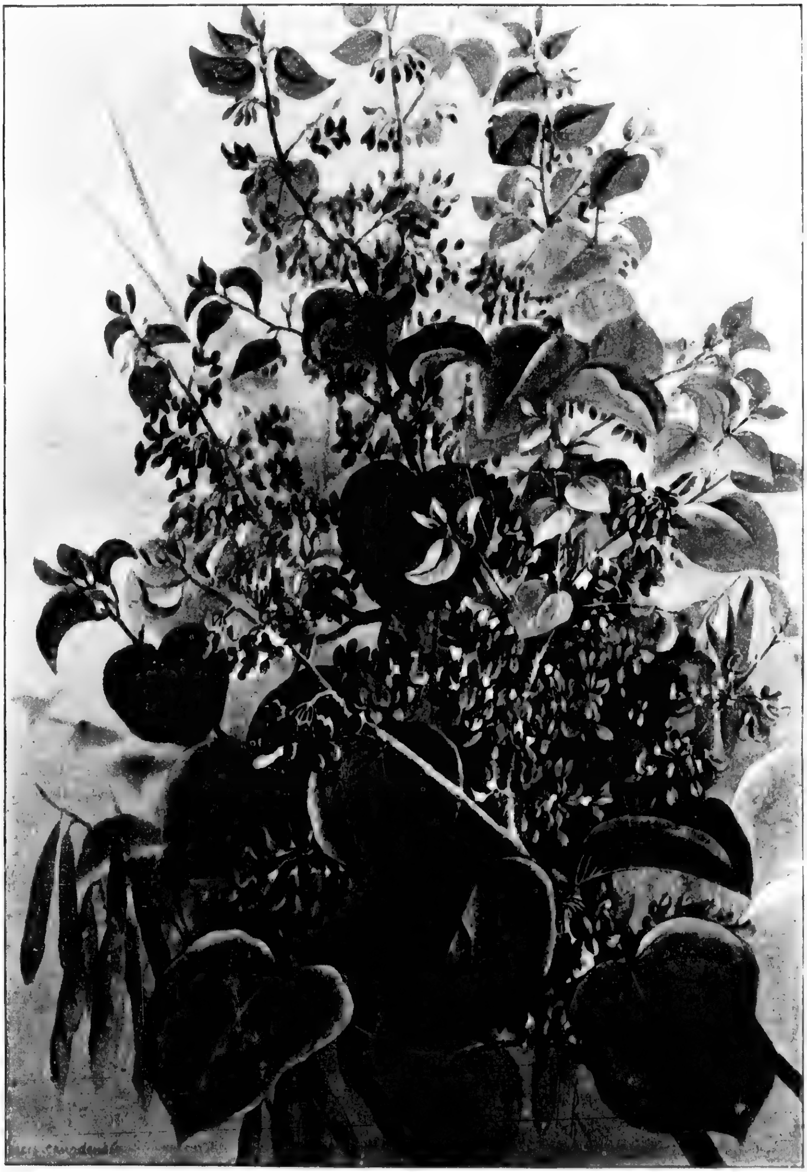

PLATE LI. RED BUD. *Cercis Canadensis.*

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West Indies the tree has many relatives, and there when the pods of the species have turned to dark, reddish purple they are called, with a strange attempt at hilarity, "dead man's fingers." After the seeds have fallen they twist many times in drying. The specimen from which the coloured illustration was painted was found at Jew-Fish Key, in southern Florida.

The yellow wood of the tree is tinted with red. It has a fine grain and a surface not unlike that of satin.

RED BUD. AMERICAN JUDAS-TREE. (*Plate LI.*)

Cércis Canadénsis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Senna.	*Broad, flat head; branches, spreading.*	10-50 *feet.*	*Ontario to N. J. southward and westward.*	*April, May.* *Fruit: Sept.*

Bark: purplish grey, the young branches almost smooth. *Leaves:* simple; alternate; with petioles which are swollen at each end into a small, round extuberance. Rounded-cordate, the apex tapering into a blunt point and the midrib sometimes projecting into a bristle. Palmately-veined; entire; glabrous or often slightly pubescent on the under side of the veins. *Flowers:* handsome; several growing in sessile, umbel-like clusters on the old wood and appearing before the leaves; acrid to the taste. *Calyx:* red. *Petals:* rosy pink; the wings overlapping or covering the small standard. *Pods:* small; shuttle-shaped; winged along the seed-bearing margin and containing many flat, puckery-tasting seeds.

This little tree, for we are most accustomed to seeing it small, is handsome at all seasons of the year; but it is truly a sight in the early days of spring when it is radiant with its exquisitely bright and cheery blossoms. So eager then is the tree to cover itself with them that they sometimes appear even upon its trunk. From a distance many might be allured to its presence and think they were approaching a profusion of deeply-tinted peach blossoms, especially when it grows in among the hawthorns and flowering dogwood. As soon as the leaves unfold, however, their shape would forbid such an error and the flowers have the papilionaceous corolla of the senna

Cércis Canadénsis.

family. The legumes are a more yellow tone of green than are the leaves and add in their turn touches of colour, like high lights, throughout the tree. When given good soil and sufficient room for development it grows rapidly in cultivation and is a charming acquisition to parks and gardens. Its dark, reddish-brown wood is not strong.

An ugly tradition that clusters about the old world relative of this tree is that from its branches Judas hanged himself.

FOUR-WINGED SNOWDROP TREE. SILVER BELL TREE. (*Plate LII.*)

Mohrodèndron Carolìnum.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Storax.	*Head, narrow; branches, stout.*	30-90 *feet, or a shrub.*	*West Va. to Illinois southward to Fla. and Texas.*	*March, April.*

Branches: reddish brown; ridged. *Leaves:* simple; alternate; slender-petioled; ovate or oblong, with pointed apex and rounded or wedge-shaped base; slightly serrate; bright green and glabrous above, slightly pubescent underneath; thin. *Flowers:* growing in loose, drooping clusters along the branches and appearing with or before the leaves. *Calyx:* short; four-toothed. *Corolla:* campanulate; four-parted. *Stamens:* eight to sixteen. *Pistil:* one. *Seed-vessels:* long; oblong; four-winged and conspicuously tipped with a remnant of the style.

Mohrodèndron Carolìnum.

So few leaves and flowers are to be seen when these fair snowdrops cover the tree that one is almost inclined to look upon them with suspicion and to wonder whether in spite of their unsullied freshness they have been desirous of taking a peep at the earth before it was fully clothed. But whatever may have been their motives, it is truly a joy to have them come forth so early in the season and to feel that the back of father Winter is broken. When hung with them the tree is a most pleasing

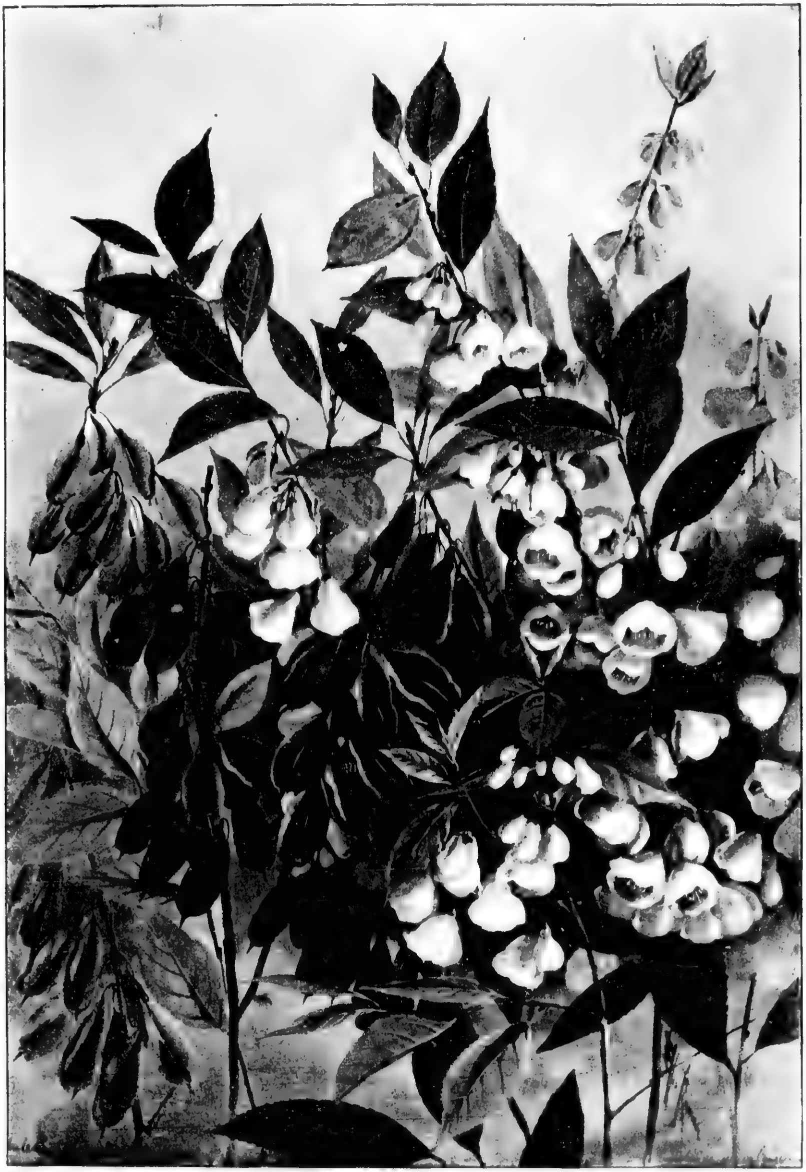

PLATE LII. FOUR-WINGED SNOWDROP TREE.

Mohrodendron Carolinum.

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sight. Often we then stop and wonder to find it among the hickories and buckeyes: it would seem as though it should find the company of the magnolias and cherry trees more congenial. On moist, wooded slopes, in woods or nearing the banks of streams it grows, and it is hardy as far northward as eastern Massachusetts. It then however becomes a shrub.

NARROW-LEAVED COTTONWOOD. (*Plate LIII.*)

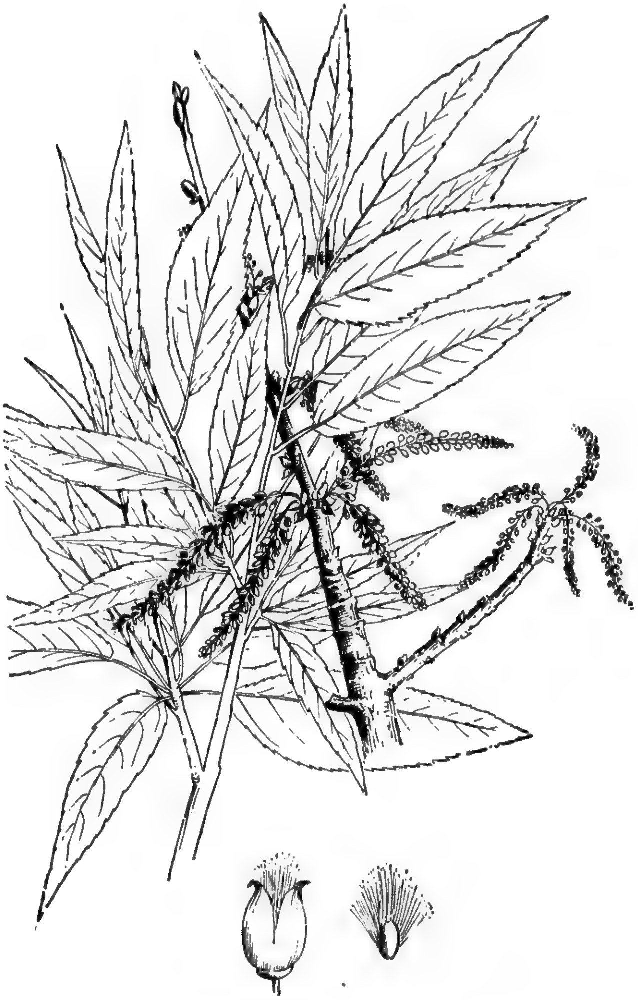
Pópulus angustifòlia.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Pyramidal, slender.*	30-65 *feet.*	*Dakota westward and to Arizona and New Mexico.*	*April, May.*

Bark: yellowish green and broken on old trees into broad, flat ridges. *Branches:* grey. *Leaves:* simple; alternate; with petioles that are not flattened laterally; lanceolate, or ovate-lanceolate; pointed or blunt at the apex and narrowed or rounded at the base; finely or coarsely serrate; yellow-green above, lighter below; the mid-rib yellow; thin. *Staminate catkins:* cylindrical. *Pistillate ones:* from two to four inches long. *Capsule:* ovate and surrounded by fine soft hairs.

When the flower-buds of the poplars begin to swell and their colour changes to deeper tints every day, then we feel as though the sleeping spring had indeed awaked. In fact many mistake these early unfolding flowers for the first shimmer of young foliage. But on both the staminate and pistillate trees the catkins lengthen and have satisfactorily settled their little domestic affairs some time before the leaves burst from their silver buds. And in this hastening into bloom there is something of method to be detected. The poplars rely on the wind to carry their pollen from one plant to another and to facilitate its reaching them, the pistillate flowers hang mostly near the tips of the branches. Were the trees fully clothed with foliage it would greatly obstruct the flying pollen and direct it into idle paths.

When the leaves of Populus angustifolia unfold their outline is rather a surprise and is seen to resemble that of one of the broad-leaved willows. From their buds exudes abundant balsam. In moist soil and along the banks of streams of the



Capsule. *Seed.*

PLATE LIII. NARROW-LEAVED COTTONWOOD. *Populus angustifolia.*

far west, especially throughout the Rocky Mountains, this poplar is the common species. Its wood is light, soft and very weak.

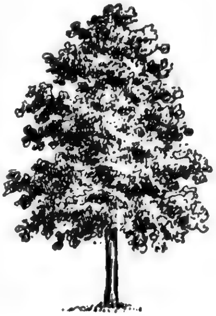
AMERICAN HOLLY. (*Plate LIV.*)

Ìlex opàca.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Holly.	*Head, compact; branches, spreading.*	20-50 *feet.*	*Southern Maine along the coast to Fla. and westward.*	*April-June.* *Fruit: Sept.*

Bark: light grey; smooth. *Branchlets:* slightly pubescent. *Leaves:* simple; alternate; elliptical or oval, with pointed apex and pointed base; the teeth, sharp and spine-like; far apart. *Sinuses:* rounded. Feather-veined, the veins indistinct on the lower surface. Evergreen; dark green and glossy above; lighter and tinged with yellow below; thick; stiff; glabrous. *Flowers:* white; both staminate and pistillate; axillary, and having their parts in fours. *Fruit:* a bright red drupe which frequently remains on the tree well into the winter.

The associations of the holly are all with the season of merry-making and the blazing log of the yule-tide. When in a wild state it needs, to bring out the beauty of its bright, red berries and thick, shining leaves, the glistening white of a snow-covered earth and the bare, gaunt branches of other trees. By contrast then its freshness is very attractive. During the dusty, heated summer it might readily be passed by unseen. The American holly is not thought to be as beautiful as the English one. There are fewer berries to be found on it; and its leaves have not nearly so high and clear a lustre. But it is still a crisp and cheery appearing tree and worthy of a more extended cultivation than it receives.



Ìlex opàca.

The wood of the holly is almost white. It is hard and fine of grain. When made into work tables, boxes and similar articles it is very pretty.

I. montícola, large-leaved holly, bears a leaf which is very distinctive from that of I. opaca. It is ovate-lanceolate, with a taper-pointed apex and a finely serrated edge. In texture it is

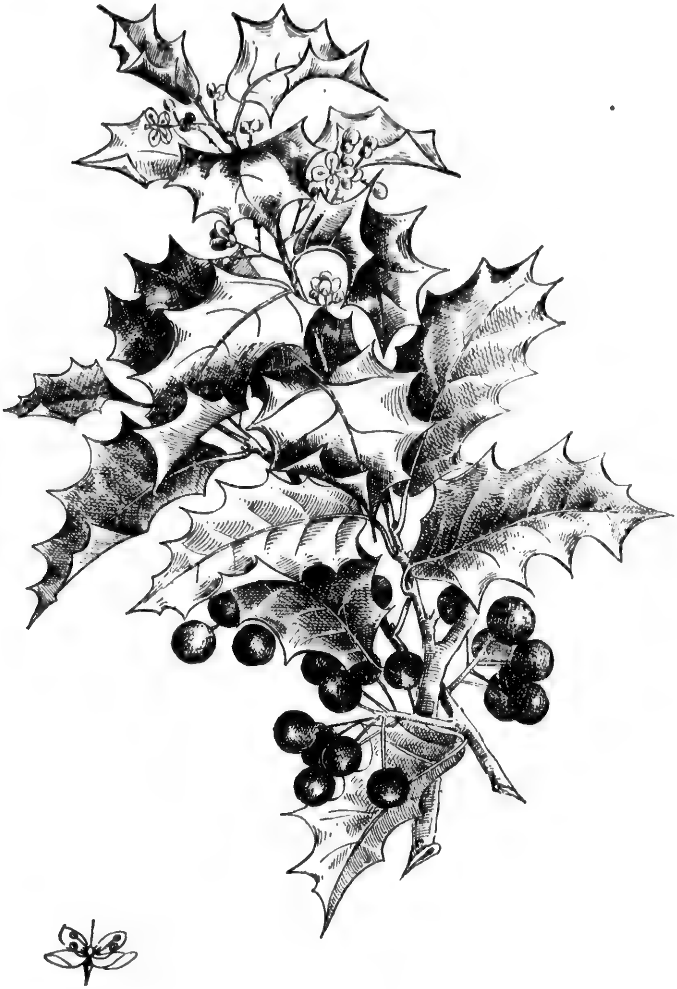

Single flower.

PLATE LIV. AMERICAN HOLLY. *Ilex opaca.*

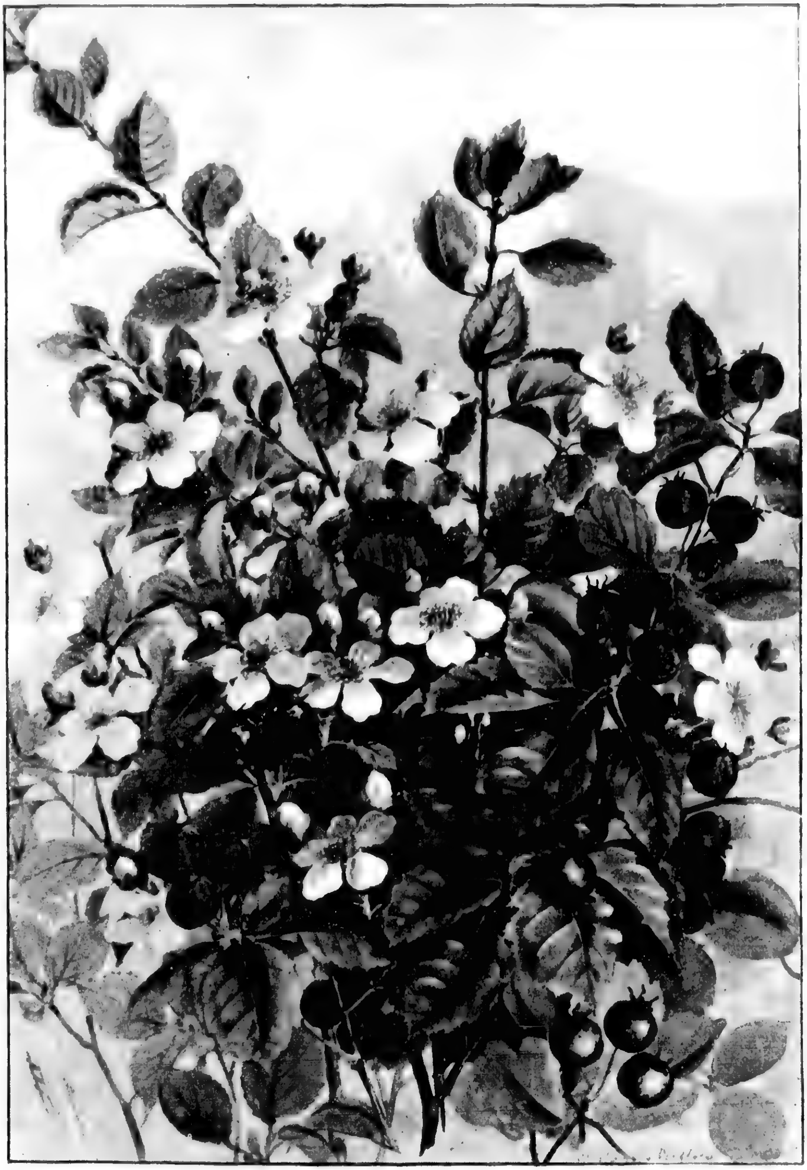


PLATE LV. THREE-FLOWERED THORN. *Cratægus triflora.*

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thin and not evergreen. The tree is rather tall and slender and occasionally reaches a height of forty feet. Again it occurs as a shrub. In May we shall find it in bloom. By many it is well known and sought for in the damp woods of the Catskill Mountains. It extends southward along the mountains to Pennsylvania and to Alabama.

THREE-FLOWERED THORN. (*Plate LV.*)

Cratægus triflòra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Spreading from base.*	12-20 *feet.*	*Georgia and Alabama.*	*April.*

Bark of branches: light greenish grey and close, becoming scaly. *Spines:* dark red; branched; numerous on the main stem. *Leaves:* simple; alternate; growing at the ends of the twigs; ovate; pointed at the apex and rounded at the base or tapering into a margin which extends along each side of the short petiole; irregularly or doubly serrate; bright dark green above and pubescent when young, later becoming rough; paler below and pubescent. *Flowers:* large; growing in corymbs of mostly three flowers on pubescent petioles, the lateral ones, the longest. *Calyx:* with five lanceolate fringed lobes. *Corolla:* with five rosaceous white petals. *Stamens:* numerous. *Fruit:* globose; brilliant orange or red.

Cratægus triflora is a rare tree: one quite imbued with the idea of seclusion. At the present time it is only known to occur at two stations; along the cliffs of the Coosa River in Georgia and near Birmingham, Alabama. Mr. Beadle, of Biltmore, who has made an exhaustive study of the genus, has seen it in bloom at the former place where, he says, there are about fifty of the trees; and he describes the effect they en masse produce, when they unfold amid the russet tints of early spring, as very lovely. "Individually," he says, "the shrub is rather poor." At the top its branches divide many times and the leaves appear to be thrust at the ends of the twigs so as to form a covering for their nakedness. The particular charm of its flowers is that they are large, and the two side ones seem to have been quaintly prolonged so as to give a sort of protection to the one in the middle. From the coloured plate this feature and the brilliancy of the fruit can be seen.

It was through the aid of a glance into the note book of Mr.

Beadle and a well dried specimen that the accompanying description was written.

AMERICAN ELM. WHITE ELM. (*Plate LVI.*)

Úlmus Americàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Elm.	*Head, round, broad; branches, pendulous.*	100-120 *feet.*	*New Foundland southward to Fla. and westward to Texas.*	*March, April. Fruit: May.*

Bark: ashy grey; flaky. *Branches:* light green when young and without corky ridges. *Buds:* flattened; smooth, or slightly pubescent. *Stipules:* linear to lanceolate. *Leaves:* simple; alternate; with smooth petioles; oval, or obovate, with taper-pointed apex and rounded or slightly pointed base; unequal sided; coarsely or doubly serrate. *Ribs:* straight; conspicuous; veins and veinlets numerous; glabrous, or slightly rough above, pubescent underneath and becoming smooth at maturity. *Flowers:* diœcious; minute; growing in close, drooping clusters on jointed stalks from lateral buds and appearing before the leaves. *Samaras:* oval or ovate; glabrous, with thickly fringed margins.

Úlmus Americàna.

The American elm is very graceful and stately. Its great arching limbs uphold a spray of dark and beautiful foliage which appears on the landscape like a suddenly arrested fountain. It is not strange that so much sentiment clings about these trees; for at times they have been associated with thrilling events in their country's history. It was under the shade of a great elm at Cambridge, Mass., that Washington stepped forward, drew his sword, and in a few words assumed command of the American army. The tree, after that eventful morning, was known as the "Washington Elm"; and longer than any other being it remained to testify to the younger generations that it had been a witness of the scene. Although not at all a phenomenal tree in size, the estimate was at the time made

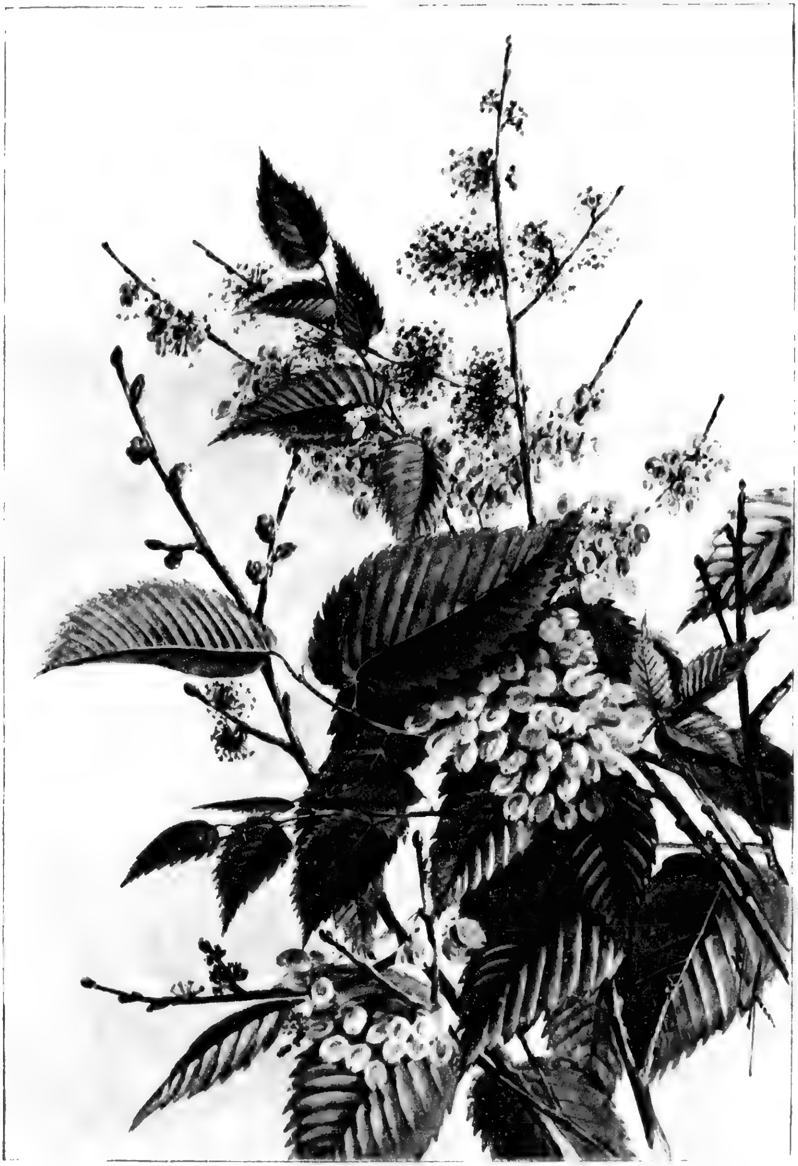

PLATE LVI. AMERICAN ELM. *Ulmus Americana.*

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that it developed every year a crop of seven millions of leaves, and that they exposed to the air a surface of foliage equal to about five acres.

On the banks of the Delaware there stood also a famous elm tree. Under its branches William Penn made his treaty with the Indians. It was not for lands, but for peace and friendship. On March 3d, 1810, "The Treaty Tree," as the elm was called, was prostrated by a storm. Its consecutive rings proved it to be over two hundred and eighty-three years old. On its site a monument with a suitable inscription was erected by the Penn society.

The elms are diœcious; their staminate and pistillate blossoms grow on different trees, or, to use the popular but erroneous expression, they are male and female. From each other the two can be readily distinguished. The bud-scales of the elms with their fringed margins and tufts of soft, white hairs are very pretty. Very early in the spring they blow about and often tint the ground while the flowers that have sprung from them are unfolding.

The wood of the American elm is rather coarsely grained, hard and heavy. Its medullary rays and its large open ducts are conspicuous. For the making of small articles, floors, and in ship building, it is very useful. The Indians occasionally substituted its bark for that of birch when building their canoes. It is to be lamented that so much damage is inflicted upon these trees by insects and that their beauty is thus often marred. Throughout New England, where the elms have contributed so much to the beauty of the towns, it is quite pathetic to see so many in a dilapidated condition. When planted the tree requires soil where it can imbibe abundant moisture, and to be away from the shade of other trees. It is very rapid of growth.

CORKY WHITE ELM. ROCK ELM. HICKORY ELM.

(*Plate LVII.*)

Úlmus racemòsa.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Elm.	*Head, round-topped: branches, rigid.*	80-100 *feet.*	*New England southward and westward.*	*April.* *Fruit: June.*

This species of elm might readily be mistaken for *Ulmus Americana* as in general characteristics there is much that is similar between the two. The marks of distinction, however, are that the young branches of Ulmus racemosa are pubescent, and as they grow older they develop large, corky wings. The fringed bud-scales are more often than not covered with a soft down, and the flowers grow in a raceme. The leaves, too, have many fine hairs on the upper surface and are not so noticeably serrate as those of *Ulmus Americana.* In the autumn its foliage turns a bright yellow. The tree inhabits low grounds where a heavy, wet clay soil prevails ; or it flourishes in gravelly uplands and on the high bluffs of rivers. It grows slowly, and its wood, although valuable, is threatened by extinction. While it has been neglected by planters, the axe has sought it with diligence. In the forests of Canada and North America most of the large trees have already been felled.

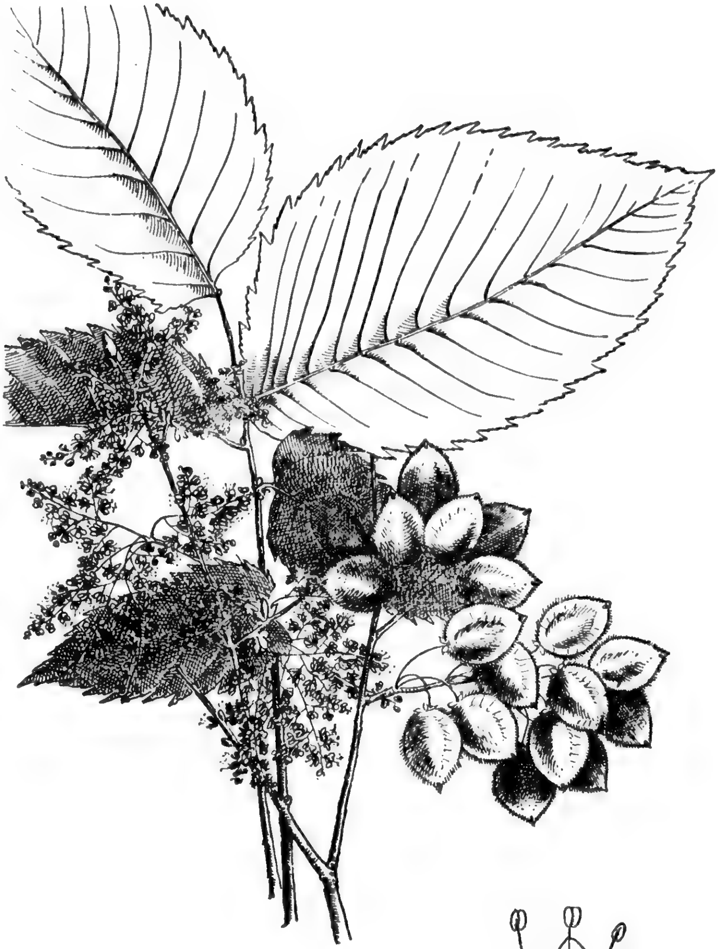
U. alàta, winged elm, Wahoo, is a comparatively small tree, forty or fifty feet high, with an open, round-topped head and slender branches, which are mostly covered with corky ridges. The leaves are somewhat rough on the upper surface and especially pubescent along the under veins. The samaras, also, are pubescent and are densely fringed on their margins. In wet, gravelly, or dry soil, the tree is known to grow. It inhabits the country from Virginia to Illinois and southward.

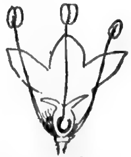
SLIPPERY ELM. MOOSE ELM. RED ELM. (*Plate LVIII.*)

Úlmus fúlva.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Elm.	*Head, broad, flat; branches, spreading.*	60-70 *feet.*	*Quebec and New England southward and westward.*	*March, April.* *Fruit: May.*

Bark: reddish brown; rough. *Branches:* bright green when young, and turning to light grey; very rough, although not having corky wings. *Inner*





Enlarged flower.

PLATE LVII. CORKY WHITE ELM. *Ulmus racemosa.*

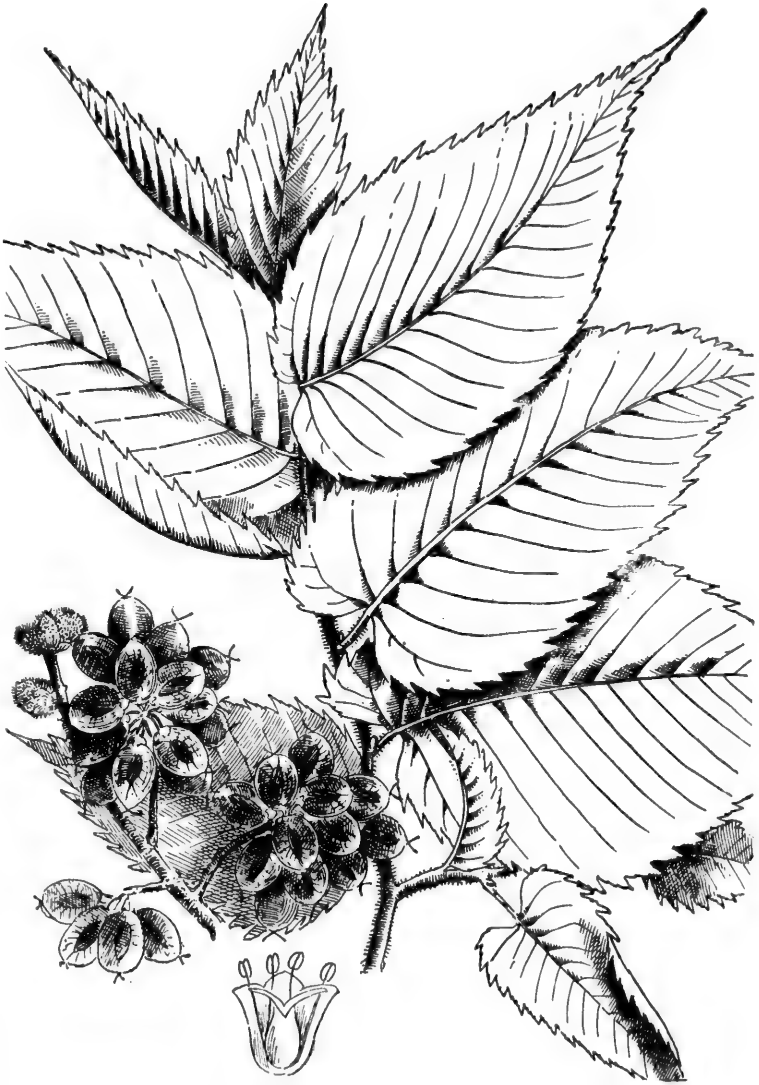
bark: white; slippery. *Leaf-buds:* large; round and covered with a reddish scurf. *Leaves:* simple; alternate; with rough petioles about an eighth of an inch long; ovate or obovate, with taper-pointed apex and rounded or slightly cordate base. Coarsely and doubly serrate; rough and harsh on the upper surface, soft and downy underneath in the angles of the straight ribs. *Flowers:* growing on short pedicels in globular clusters; fragrant when dried. *Samaras:* dull yellow; semi-orbicular and containing a round, flat seed. The margins of the wings unfringed; glabrous, excepting over the seed.

There is something intensely human in the desire to chew,—to chew the cud of meditation; and when in the open country one meets a boy with a certain felicitous expression and wagging jaws, it is good evidence that somewhere in his rambles he has met with the slippery elm tree. Should his pockets be turned inside out there would also be a chance of finding a quantity of its fragrant, inner bark stored away for future disposal. To chew this gummy, slippery substance is not, perhaps, the smallest item in his enjoyment as he carelessly breathes the summer air or gazes at a cloudless sky. Unfortunately this innate desire of the boy is often gratified at the tree's expense. In fact, it is almost impossible to protect it from him, when it is cultivated as an ornament in parks, and its identity is known. In a more conventionalized form the inner bark is sold by chemists, and its properties are medicinal and nutritious.

The tree has a fine, shapely outline, and grows rapidly. Its dark reddish wood is strong and durable and is largely used for the making of posts. When green it splits very readily.

Ulmus campéstris,

U. campéstris, English elm, is in this country very frequently seen in cultivation and has distinctive characteristics which prevent its being confused with the native wild species. Its branches are comparatively short and grow in a horizontal or ascending line. This gives it a compact, robust look; very dif-



Enlarged flower.

PLATE LVIII. SLIPPERY ELM. *Ulmus fulva.*

ferent from the graceful, languorous droop of the American elm. The leaves are smaller and grow densely on the wingless branches. Their upper surfaces, also, are less rough. Sometimes for weeks after those of the native tree have fallen they remain fresh on the branches. The samaras of the English elm are smooth and without fringed margins, and its bark is very dark and much broken. It is not frequent that the tree escapes from cultivation.

U. suberòsa, is a variety of the preceding species and has an immense amount of corky stuff on the branches.

HACKBERRY. SUGAR-BERRY. FALSE ELM. NETTLE-TREE. (*Plate LIX.*)

Céltis occidentàlis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Elm.	*Round-topped: branches, spreading, or pendulous.*	15-50-140 *feet.*	*Quebec southward and westward.*	*April, May.* *Fruit: Sept.*

Bark: silver-grey or brown; crumpled; rough. *Stipules:* linear; whitish, with a soft down. *Leaves:* simple; alternate; with slender, grooved petioles; ovate, with taper-pointed apex and one-sided, pointed, rounded or cordate base; serrate, becoming entire at the base. Very variable. Bright green; glabrous and lustrous above, paler underneath and sometimes pubescent along the ribs. *Flowers:* greenish; axillary; the staminate ones clustered; the pistillate ones solitary and drooping on a peduncle. *Calyx:* five and six parted. *Stamens:* long. *Fruit:* a small, globular drupe; purplish red, becoming nearly black when ripe, with a thin pulp; edible; sweet.

It is a very unusual sight to see this tree or, sometimes, shrub growing over fifty feet high, although at times it stretches itself upward until it reaches one hundred and forty feet. Not long ago one was reported to measure one hundred and twenty feet high, and five feet in diameter at a distance of four feet from the ground. Its appearance was strongly suggestive of a very old elm. The tree is admirable for the purpose of transplanting and when well developed is very effective. It grows rapidly and displays great endurance against dry weather or a long drought. The leaves in the autumn turn a light yellow. From its wood which is coarsely grained and rather soft a

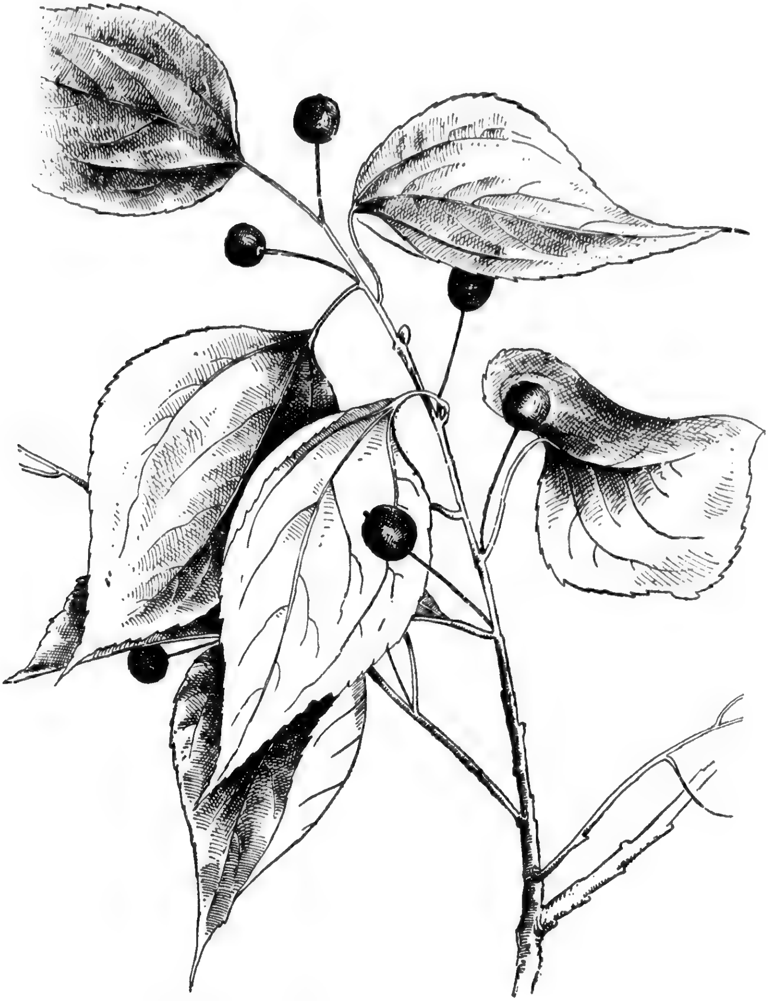


PLATE LIX. HACKBERRY. *Celtis occidentalis.*

cheap kind of furniture is made. Celtis is the ancient name of the Greeks for the lotus.

RED MULBERRY. (*Plate LX.*)

Mòrus rùbra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Mulberry.	*Head, round, dense; branches, spreading.*	15-60 *feet.*	*Western New England, southward and westward.*	*April, May.*

Bark: greyish brown; rough and separating into plates. *Leaves:* three to seven inches long; simple; alternate; ovate; approaching orbicular, with pointed apex and rather cordate base; or frequently occurring with unequal lobes at the sides when the sinuses are rounded; coarsely serrate; thin; yellow-green and rough on the upper surface when young, becoming dark bluish green and smooth; paler and downy or smooth below. *Ribs:* whitish and distinct. *Flowers:* growing in axillary, catkin-like spikes; either diœcious or monœcious, usually the latter. *Fruit:* similar in appearance to a long, wild blackberry; red, turning when ripe to a rich, dark purple; edible; sweet.

Mòrus rùbra.

A homely barnyard scene, where chickens and pigs rove about at will and a lordly turkey gobbler exercises a surveillance over all, is hardly complete without the shade of a red mulberry tree. No doubt it has been planted there by the farmer or his predecessor who knew that its juicy fruit would fatten his hogs and nourish well his poultry. The flavour is a trifle insipid, but these animals are not over discriminating and root and scratch under the tree when the berries are falling until the ground is often stained to the same deep, blood hue. The juice of the tree itself is milky. Horticulturists have paid little attention to Morus rubra as a fruit tree although it would seem as though it had possibilities for a better development. The tree is very ornamental. In early summer the green of its leaves is particularly enchanting and can hardly fail to attract the attention

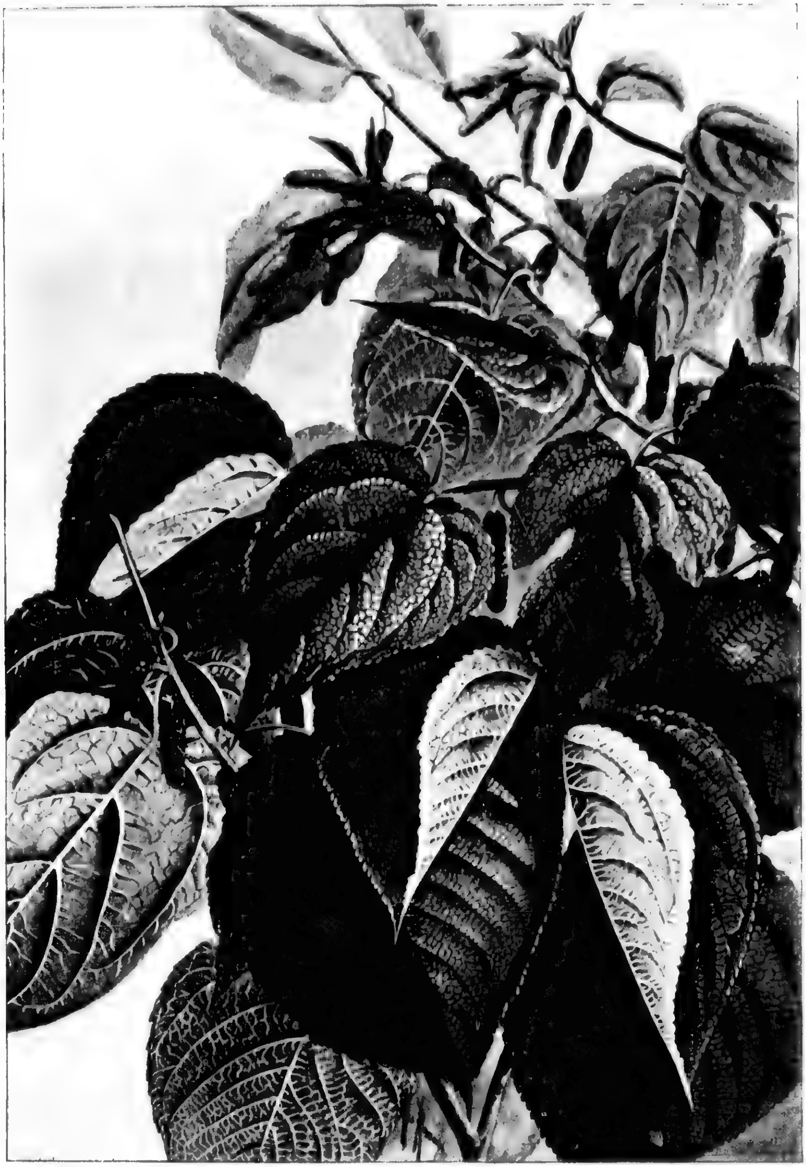


PLATE LX. RED MULBERRY. *Morus rubra.*

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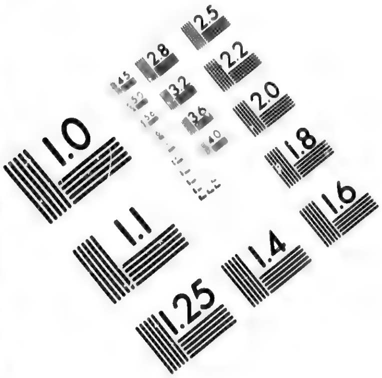

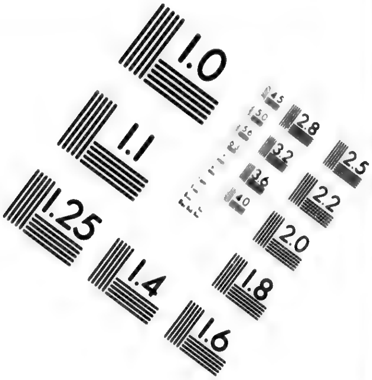

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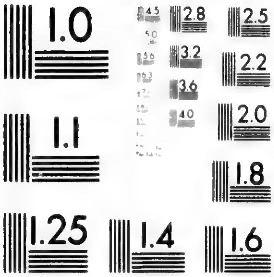

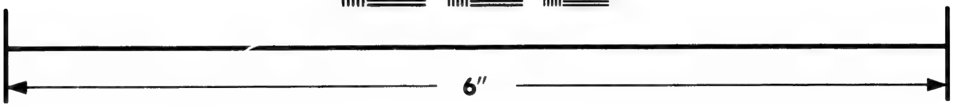

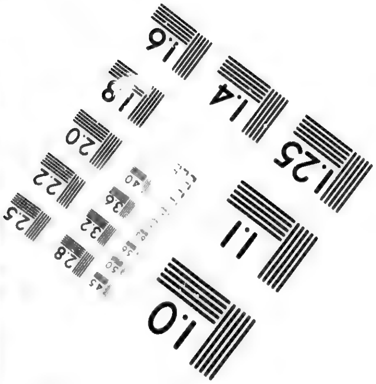

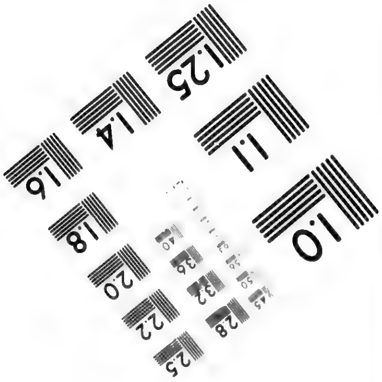

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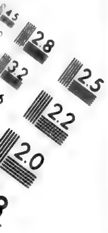
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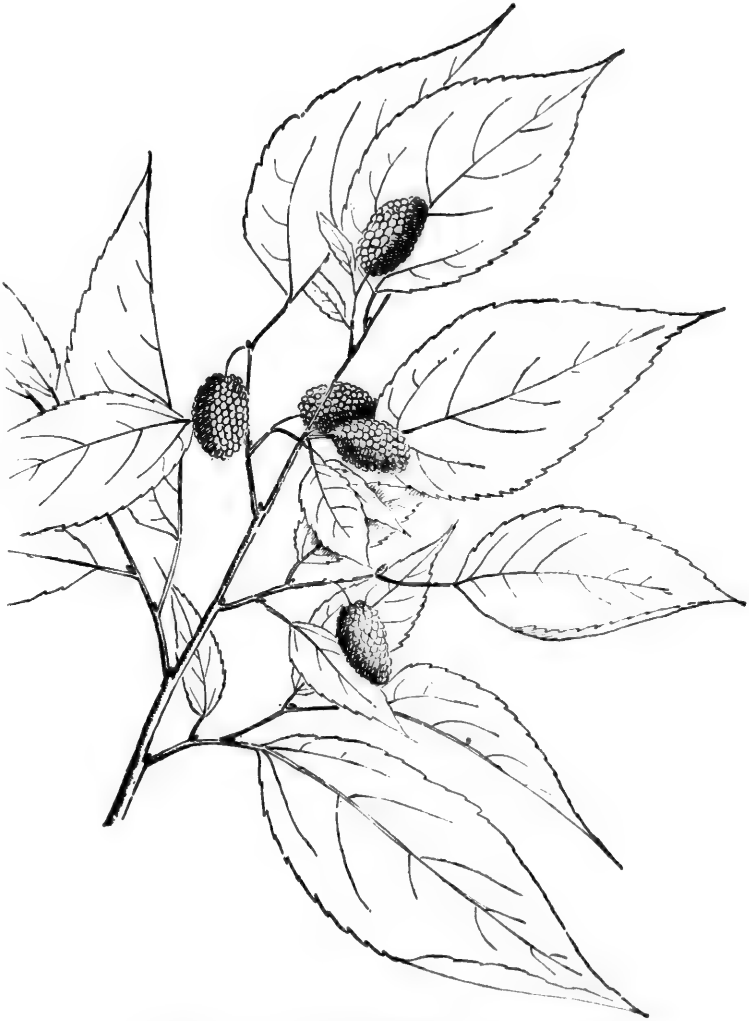


PLATE LXI. WHITE MULBERRY. *Morus alba.*

of those that have an eye for colour. In their composition there is an abundance of yellow, and they give an effect as though they were continually glowing with sunshine.

The Indians of the southern states have some way of obtaining fibres from the tree's inner bark, and these they weave into cloth. The wood is light yellow, soft and very durable when in contact with the ground. It is quite valuable.

Mòrus alba.

M. alba, white mulberry, (*Plate LXI.*) is a similar and very familiar tree which is also seen about old farmhouses. It has escaped from cultivation. The tree is small and has leaves that differ from those of the red mulberry in being smooth and shiny on both sides. Its short, compact, staminate spikes grow on slender peduncles. The fruit is white or slightly tinted with pink and has an insipid, sweetish flavour. In about 1830 the tree was introduced from China, and in the old world, as is well known, its leaves have for a long time been fed to silkworms.

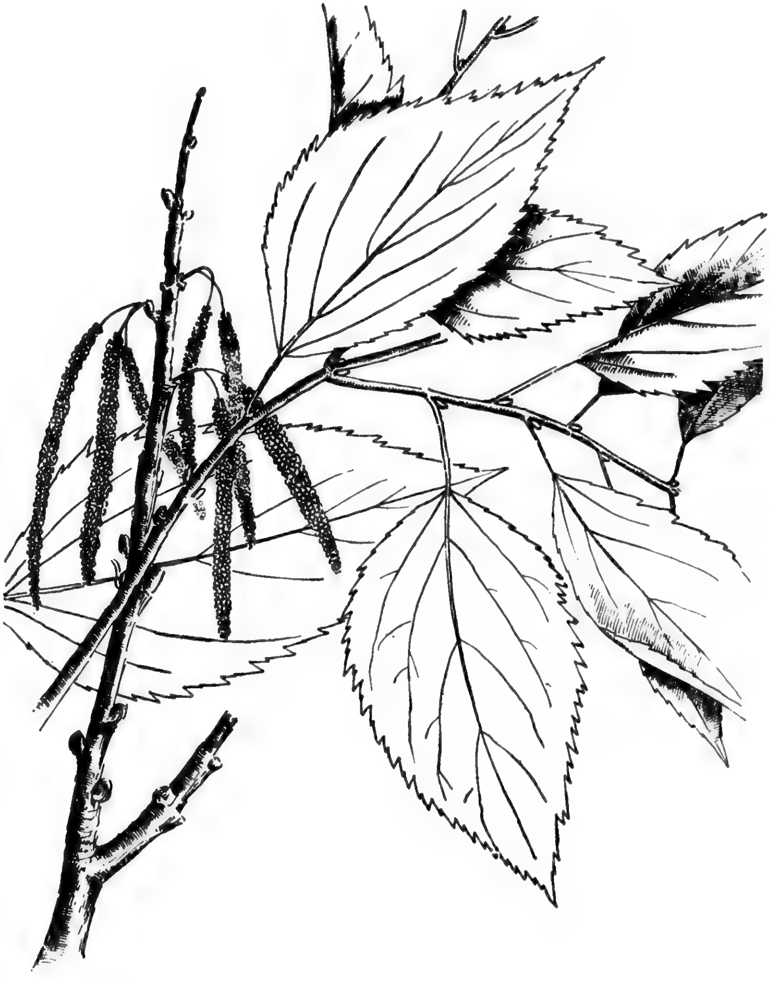
PAPER MULBERRY. (*Plate LXII.*)

Broussonétia papyrífera.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Mulberry.	*Low branching.*	20-30 *feet.*	*New York southward.*	*May, June.* *Fruit: June, July.*

Bark: light; fibrous; rather smooth. *Leaves:* simple; alternate; with long, round petioles; broadly ovate, with pointed apex and slightly pointed or cordate base, or frequently occurring with from two to three unequal lobes when the sinuses are rounded; serrate; thick; the upper surface rough, like velvet, the lower surface downy. *Flowers:* diœcious; the sterile ones growing in spike-like catkins, the fertile ones in rounded heads; scaly; bristly. *Fruit:* fleshy; not edible.

Very frequently about old houses or in dilapidated graveyards we find this tree which has escaped from cultivation. Its low-growing branches afford in such places a desirable



Flowering branch.

PLATE LXII. PAPER MULBERRY. *Broussonetia papyrifera.*

shade. In Japan, whence it has been introduced into this country, and also in China, the very fibrous bark is utilized to make paper and this circumstance is responsible for its English name. The leaves of the tree might readily be confused with those of the red mulberry, but its club-shaped fruit is quite different and is far from being edible. The tree spreads itself by suckers.

BURR OAK. MOSSY-CUP OAK. OVER-CUP WHITE OAK.

(*Plate LXIII.*)

Quércus macrocárpa.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Round-topped, broad; branches, spreading.*	60-80-160 *feet.*	*Maine to Penn. and westward to Montana, southward to Texas.*	*May, June.*

Bark: brownish grey; furrowed. *Branchlets:* marked with corky-winged ridges. *Leaves:* six to fifteen inches long; simple; alternate; with thick petioles, flattened and enlarged at their bases; obovate; lyrately pinnatifid, with wedge-shaped base and from five to seven long, irregular lobes; rounded or hollowed at their apexes; entire or wavy. The sinuse of the middle lobe sometimes extending to within an eighth of an inch of the midrib. Dark green, smooth and lustrous above; silvery white and downy underneath. *Staminate flowers:* growing in slender catkins with greenish-yellow stems. *Pistillate catkins:* sessile. *Acorns:* very large; handsome. *Cup:* cup-shaped; covered with rough, pointed scales, the upper row of which terminate in long bristle points and form a mossy soft fringe about the nut; pubescent on the inner surface. *Nut:* one to one and a half inches long; oval and almost covered by the cup.

About this noble tree there is the same semblance of strength and durability as is so generally associated with the oaks. It is one of the largest of the family of Eastern North America and is more widely distributed than any other, although comparatively rare east of the Alleghanies. To various climatic conditions it shows much adaptability. On the prairies the "Oak Openings" are mostly composed of the burr oak; and one that has entered them has said, "he knew not whether he shuddered from fear or delight." In the Mississippi basin it is commonly seen in lowland forests. As it occurs northward it is interesting to notice that the acorns become very much smaller, and as the length of their fringe is proportionately reduced, they cease to

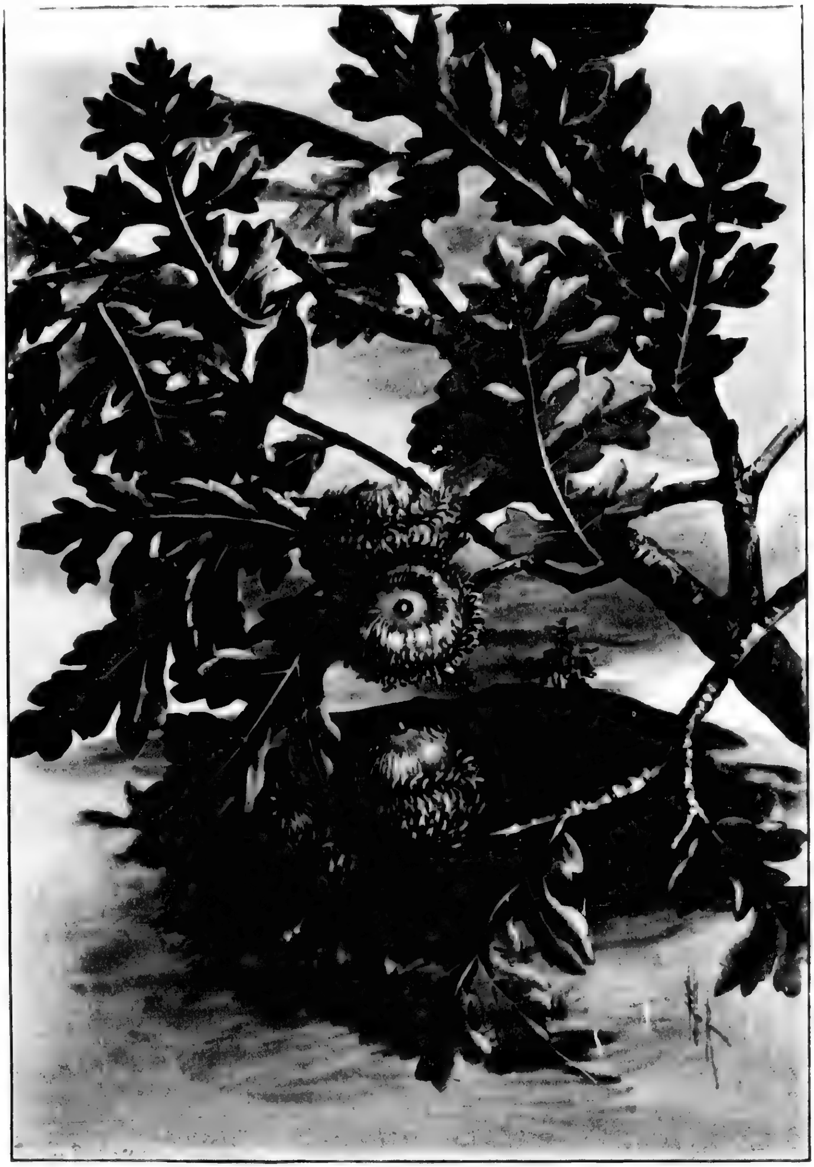


PLATE LXIII. BURR OAK. *Quercus macrocarpa.*

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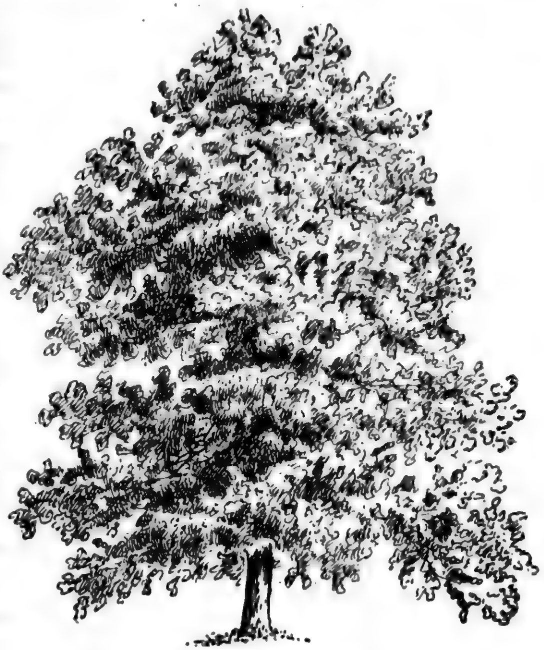


Quércus macrocárpa.

suggest the dainty bird's nests that they do in the south. Hardly a more beautiful tree can be imagined in cultivation when enough room has been given it to follow its own bent of development. One then looks upon its great head and branches with almost a feeling of awe.

As a timber tree it is excelled in value by few trees of North America. Its dark brown wood closely resembles and is sometimes confused with that of the white oak, but it is superior to it in strength.

PIN OAK. WATER OAK. SWAMP SPANISH OAK.

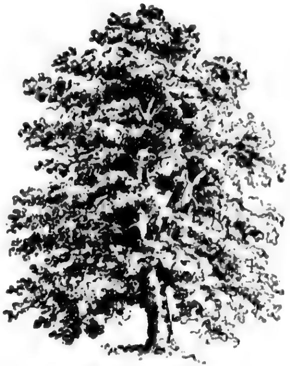
(*Plate LXIV.*)

Quércus palústris.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Tapering towards the top; lower branches, declined.*	40-60 *feet, or higher.*	*Mass. southward and westward.*	*May, June.* *Fruit: Sept., Oct.*

Bark: dark grey or greenish brown; rough, with furrows that are slight and far apart; the bark of the branches often cracking and showing the reddish inner bark. *Leaves:* three to five inches long; simple; alternate; with yellow petioles; obovate; broad; tapering or squared at the base, and having from five to nine lobes which are toothed and bristle-tipped at the ends. *Sinuses:* broad; rounded; and extending fully three quarters of the way to the midrib; bright green; smooth and lustrous above, paler below and tufted in the angles of the ribs with reddish hairs. *Flowers:* monœcious; the staminate ones growing in slender catkins; pistillate ones mostly solitary. *Acorns:* small; growing on short stems or sessile. *Cup:* flat; saucer-shaped; finely scaled. *Nut:* light brown; rounded; often striped; very broad, with a thin shell.

The leaves of the pin oak strongly suggest to us in general outline those of the scarlet oak, page 244. When we come to examine them closely, however, we notice among other things that they are smaller and that their sinuses extend nearer to the midrib. These very differences, although they may seem slight, do in reality change the whole aspect of the trees, and give to the pin oak a lighter, more delicate appearance which is very pretty. When young it is tapering and symmetrical in outline; but age seems to distort it, and it becomes irregular and straggling. Its pendulous branches mark it distinctively. In early spring when the tree is blooming, its delicate maize-coloured catkins hang among the tender green leaves and sway and nod with them most enchantingly. In lowlands and guarding the borders of streams the tree is common, and it sometimes is found extending its roots into the river bed. In all places the tree has its own peculiar beauty, and it is an excellent one for planting. In the autumn its leaves turn a deep, rich red. Its wood is coarse and not of any great value. It warps badly in drying.



Quercus palustris.

Galls, or oak-apples as they are sometimes called, are the round excrescences made on the branches of oak trees by gall-flies and their larvæ. In some parts of New Jersey it seems as though they had an especial preference for this species. Often in the spring before enough green has been put forth to cover the bareness of winter it is quite pitiable to see so many galls clinging to the branches and destroying the appearance of really fine

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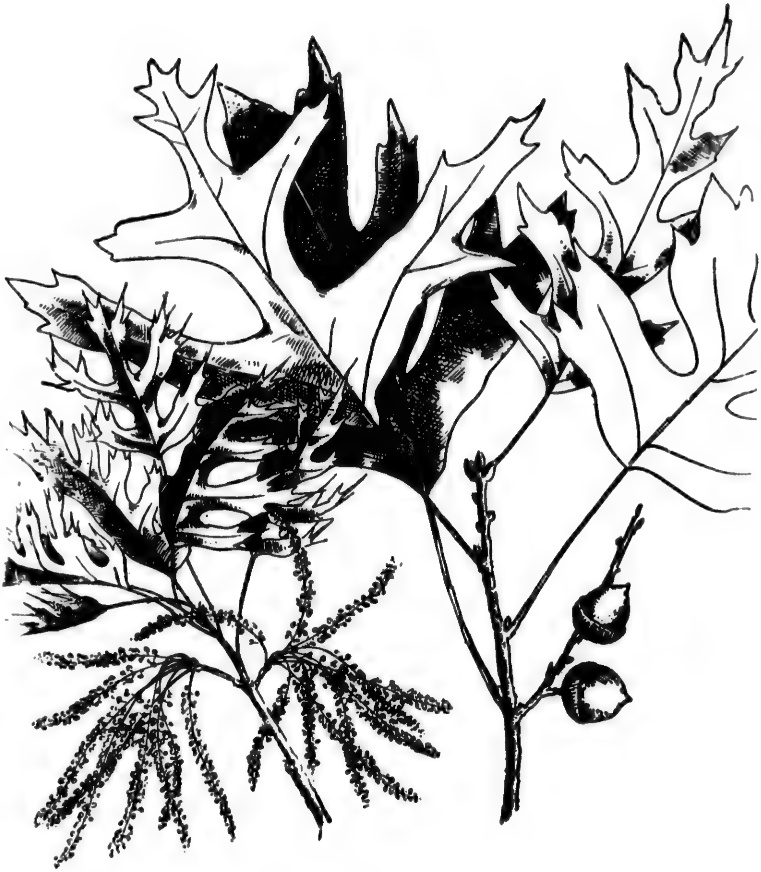

PLATE LXIV. PIN OAK. *Quercus palustris.*

trees. "That is a typical degenerate," is a criticism called forth by one poor tree that was almost covered with them. And it was so. When broken open little green worms are found to be inhabitants of the galls, and they seem to thrive amazingly well in the porous substance.

SWEET GUM. BILSTED. ALLIGATOR TREE. STAR-LEAVED GUM. (*Plate LXV.*)

Liquidámbar Styracíflua.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Witch-hazel.	*Rounded; branches, slender.*	60-140 *feet.*	*Conn. and southern N. Y. southward and westward to Ill.*	*April, May.*

Bark: reddish brown; very rough. *Branchlets:* usually covered with corky ridges. *Stipules:* lanceolate; entire. *Leaves:* simple; alternate; with slender petioles; rounded in outline; cordate at the base; palmately-lobed, the lobes from five to seven, usually five; finely serrate; brilliant, smooth and lustrous above; ribs tufted in their angles below. *Odour:* pleasant, when bruised. *Flowers:* monœcious; the staminate ones growing in a dense terminal raceme; the pistillate ones growing in an axillary, peduncled head. *Fruit:* a hanging globose ball of woody, pointed pods which open and release the few good seeds contained within each one.

This most beautiful tree has many distinctive features. In fact it seems to have a horror of doing things after any conventional pattern. Its ideas are most chaste and original. In the symmetry of their form and texture the star-like leaves are perfect, and the quaint balls of fruit which hang on the trees over the winter are most interesting. The tree is also the only species of this country. In the south it grows to a greater height than it does northward, and its spicy, fragrant gum exudes more abundantly from its bark. Amber fluid is the translation of the tree's generic name which was bestowed on it in reference to this gum or copal. It is quite valuable and is much used as a substitute for storax. The leaves contain tannin. Every year we notice that this tree is being more extensively planted, and in beauty of outline and detail it might almost be said to be unrivalled. As soon as the summer has begun to wane the leaves turn a brilliant, deep crimson. There is a shining bright-

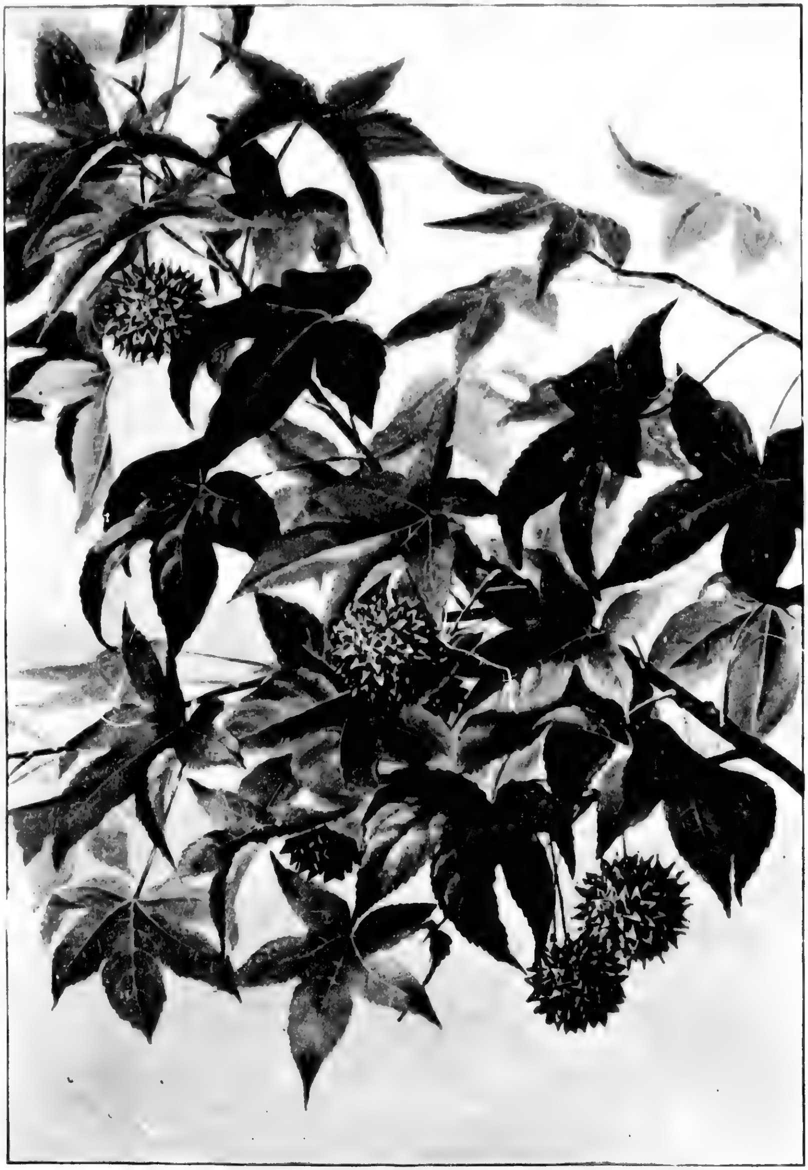

PLATE LXV. SWEET GUM. *Liquidambar Styraciflua.*

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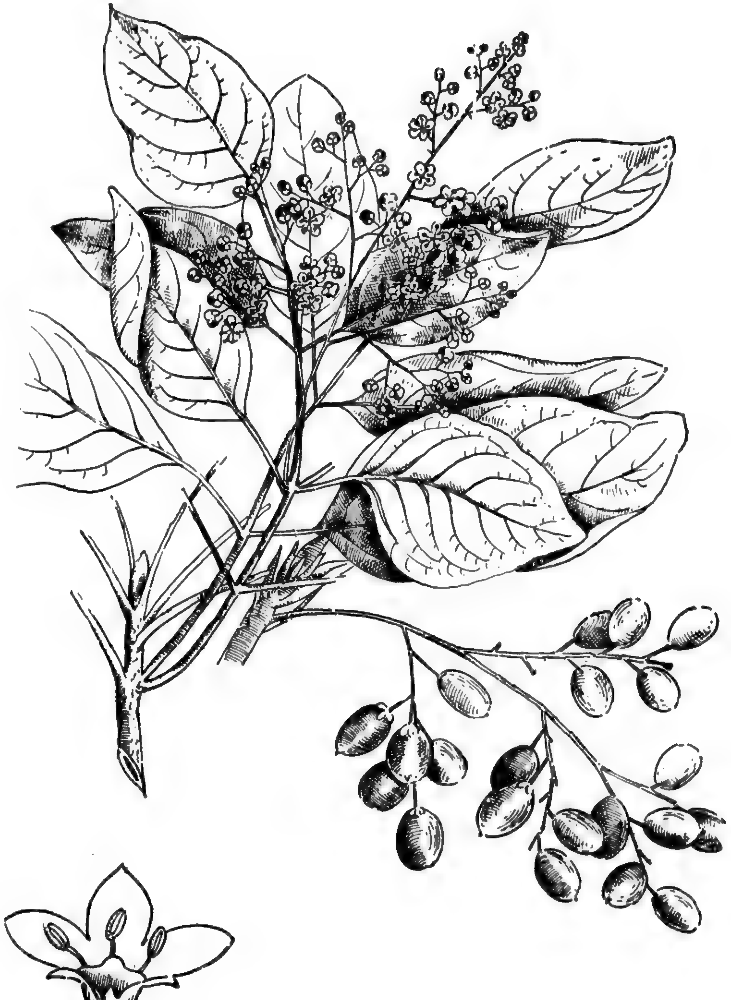

Staminate flower.

PLATE LXVI. CORAL SUMAC. *Rhus Metopium.*

ness about these leaves, and when a spray of them is gathered they bear well a close inspection; for they are not defaced or worm-eaten as is so much of the autumn foliage. In fact insects are very shy of the tree, and borers inflict no damage on the wood. The brownish-red wood of the sweet gum is smooth and has a fine finish. It is not very strong and in drying warps badly. It has, however, been used as a substitute for black walnut.

CORAL SUMAC. POISON WOOD. HOG GUM.

(*Plate LXVI.*)

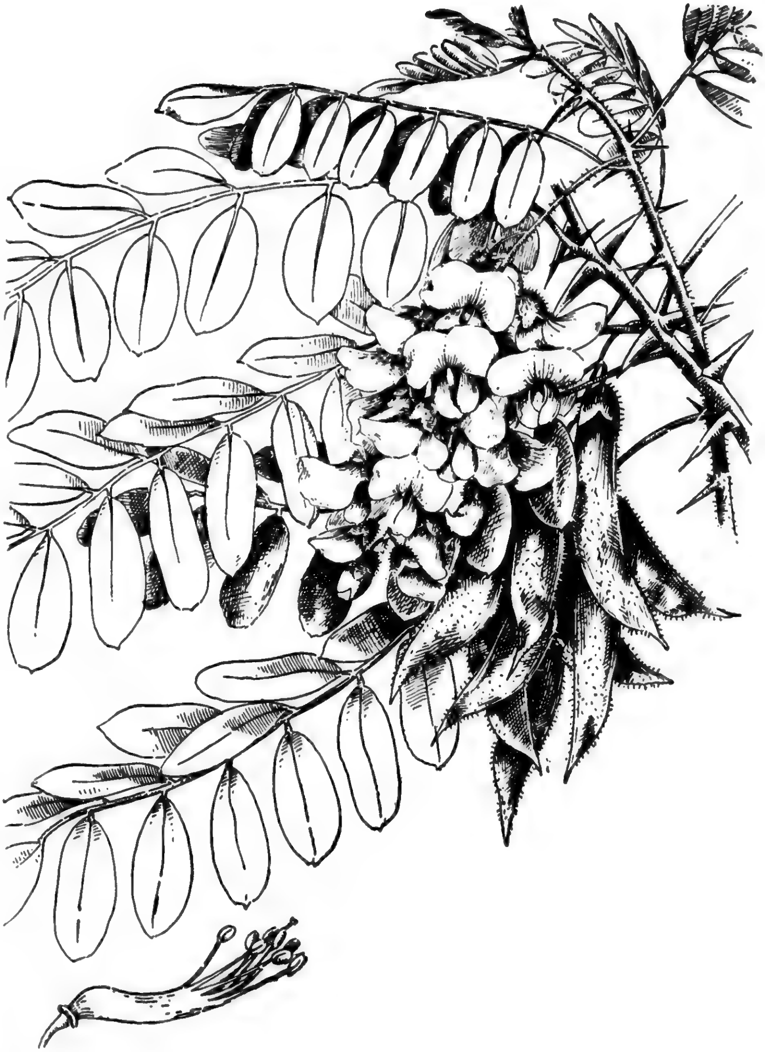
Rhús Metopium.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Sumac.	*Head, broad; branches, spreading or pendulous.*	20-40 *feet.*	*Florida and Florida Keys.*	*April-June.*

Bark: reddish brown; separating into thin plate-like scales. *Inner bark:* orange. *Branchlets:* with many deep, orange-coloured excresences. *Leaves:* compound; alternate; growing near the end of the branches, with petioles that are enlarged at their bases; odd-pinnate, with usually five ovate leaflets rounded at the apex, and rounded, squared or wedge-shaped at the base; entire; thick; glabrous on both sides; olive-green above, paler below, the terminal leaflet sometimes longer than the others. *Flowers:* diœcious; growing in long axillary, erect panicles. *Fruit:* many deep orange-coloured drupes about half an inch long; obovate; glabrous; poisonous.

About the southern keys and along the shores of Bay Biscayne in southern Florida the coral sumac is common. It is one of the most beautiful of all the smaller trees. In colour its young bark is exquisite and suggests the mellow tones of deeply tinted copper. Even though it is so fair, however, confidence in it is sadly misplaced. The breath exhaled by the dainty flowers is very poisonous, and its juices produce the same symptoms of illness as do those of *Rhus toxicodendron*, poison ivy. From incisions made in its bark an emetic and resinous gum is obtained which has some commercial value.

The wood of the tree is not much used for it is rather weak. In colour it is dark brown and is very effectively lined with red.



Flower stripped of envelope.

PLATE LXVII. WESTERN LOCUST. *Robinia Neo-Mexicana.*

WESTERN LOCUST. (*Plate LXVII.*)

Robinia Neo-Mexicàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pea.	*Spreading.*	10-25 *feet.*	*Colorado to New Mexico and westward.*	*May.*

Bark: light brown; rough and scaly. *Stipules:* developing later into spines. *Leaves:* compound; alternate; with long pubescent petioles and having from fifteen to twenty-one leaflets; oblong-elliptical, rounded or pointed at the apex and rounded at the base; entire; bluish green and glabrous above, slightly pubescent on the lower sides of the veins and midrib. *Flowers:* rose colour; or nearly white, growing in short, compact racemes. *Calyx:* hairy. *Corolla:* papilionaceous, the standard low and broad. *Legumes:* linear; curving; pointed at the lower end and covered with bristly hairs. *Seeds:* dark brown.

There is something particularly distinct and beautiful about all of the locusts; and if we have followed only one of them in its course of development from the early swelling of its buds to the change and oxidation of its leaves in the autumn, it is only reasonable to feel ourselves somewhat in harmony with the whole genus. It then becomes a matter of intense interest to note the smallest variation in flower or foliage or fruit that aids to distinguish one species from another.

In Colorado only, does Robinia Neo-Mexicana become a tree; in other places it occurs as a shrub. Through cultivation it is becoming familiar, and it is quite hardy in New England. Time however is required for it to regard the nearness of man with fearlessness. Its instincts warn it, like those of the savage, to be on the defensive. We notice therefore that it is most abundantly supplied with sharp spines. Along the banks of wild mountain streams in its natural habitat these were its faithful weapons and protected its buds and bark from the ravages of small animals.

AMERICAN MOUNTAIN ASH. ROWAN TREE. AMERICAN SERVICE TREE. (*Plate LXVIII.*)

Sórbus Americàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Almost pyramidal, slender.*	10-30 *feet.*	*New Foundland westward and southward along the Alleghanies.*	*May, June.* *Fruit: Sept.*

Bark: dull brown; almost smooth; odour, astringent. *Leaves:* compound; alternate; odd-pinnate; with red, grooved stalks and from nine to seventeen

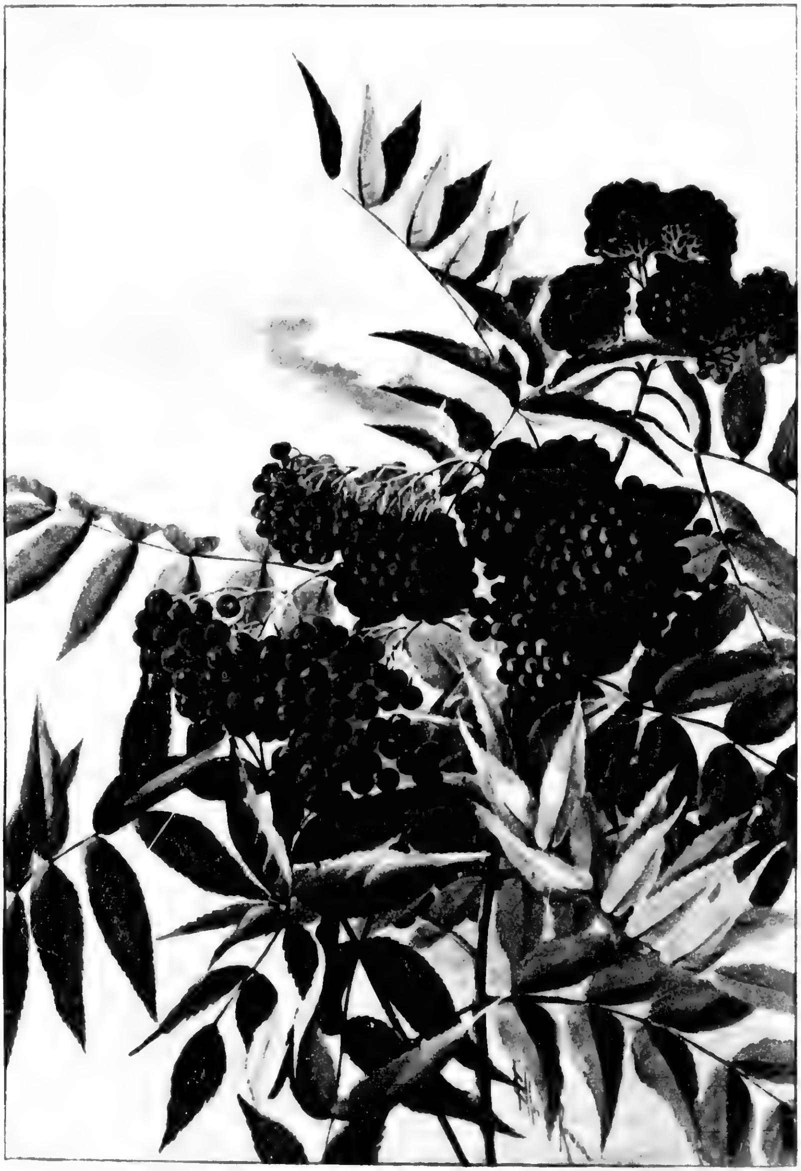


PLATE LXVIII. AMERICAN MOUNTAIN ASH. *Sorbus Americana.*

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almost sessile, long ovate or lanceolate leaflets, taper-pointed at the apex and pointed or rounded at the base. Finely serrate; bright green above; paler below and glabrous on both sides. *Flowers:* small; white; growing in large flat cymes, as many as a hundred blossoms in some clusters. *Fruit:* bright red scarlet berries about the size of large peas with a black spot at the apex.

It is not only in the spring that there is so much of beauty about the trees; although they then seem to be having their revel of mirth and lavishness. The autumn, with its line of purple in the sky, its many tinted mountains and hills, its richly-coloured fruits that are busy scattering their seeds, so beautifully fulfils the promises of early spring that there seems to be about it an even greater charm. But there is a note of sadness in the autumn, for it sings that the summer is past. Grim Winter is on his way, and who would stay his unerring step as he returns to reclaim his own? At this season of the year the berries of the mountain ash are cheerful things to look upon. Their shower of scarlet is abundant, and they remain on the trees for a long time. In cultivation the tree is now so frequent and familiar that it is almost a surprise to meet it in its natural habitat. It then grows in low or moist ground; sometimes even in swamps and cold mountain woods. An identical form of the tree occurs in Japan.

S. sambucifòlia, Western mountain ash, or elder-leaved mountain ash, has broader and shorter leaflets than those of Sorbus Americana which are doubly toothed and have blunt points. It also grows in moist soil.

S. ancupària, Rowan tree or European mountain ash, differs again in having leaves that are pubescent on both sides, especially so when young. The calyx of its flowers and the pedicels are woolly.

Rowan tree as it is generally called is reported to have escaped from cultivation on Prince Edward Island. Just how it did so is not related; but it probably hoodwinked the officials or tossed a sleeping draught to the gate keepers, for it has a long established reputation for witchcraft and the power to dispel evil spirits.

BILTMORE ASH. (*Plate LXIX.*)

Fraxinus Biltmoreàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Olive.	*Head, open; branches, spreading.*	30-100 *feet.*	*Ga. to Va., Tenn. and Ala.*	*April-June.*

Upper bark: light bluish grey. *Twigs:* stout; velvety. *Buds:* dark brown. *Leaves:* two to three inches long; compound; opposite; with dark, pubescent petioles; with from seven to nine oval, ovate or oblong-lanceolate, leaflets pointed at the apex and pointed or rounded at the base; entire or remotely dentate; soft light green and glabrous above, lighter and velvety below. *Samaras:* large, growing three to five inches long in dense panicles; the wing many nerved and slightly lobed at the apex. *Seeds:* elliptical.

Fraxinus Biltmoreàna.

Among the ashes there is hardly one more graceful or with foliage of a more sunny, exquisite green than that of the Biltmore ash. It is light and restless, and after it has faded and fallen the tree looks as though it missed it sadly; but the seed pods which have then turned to a dull tan colour still cling to the tree and for a long time hang in great bunches upon its boughs as though to cheer it for its loss.

The tree received its name from Mr. Beadle who so christened it because it is the common species on the Biltmore estate. It there grows abundantly along the French-Broad and Swanona Rivers. In general appearance the tree suggests the white ash, *Fraxinus Americana*, more than any other, although it may be distinguished from it by the pubescence of its twigs and petioles. Occasionally it grows to the height of a hundred feet, but when it occurs in drier soil and among the mountains it is generally small.

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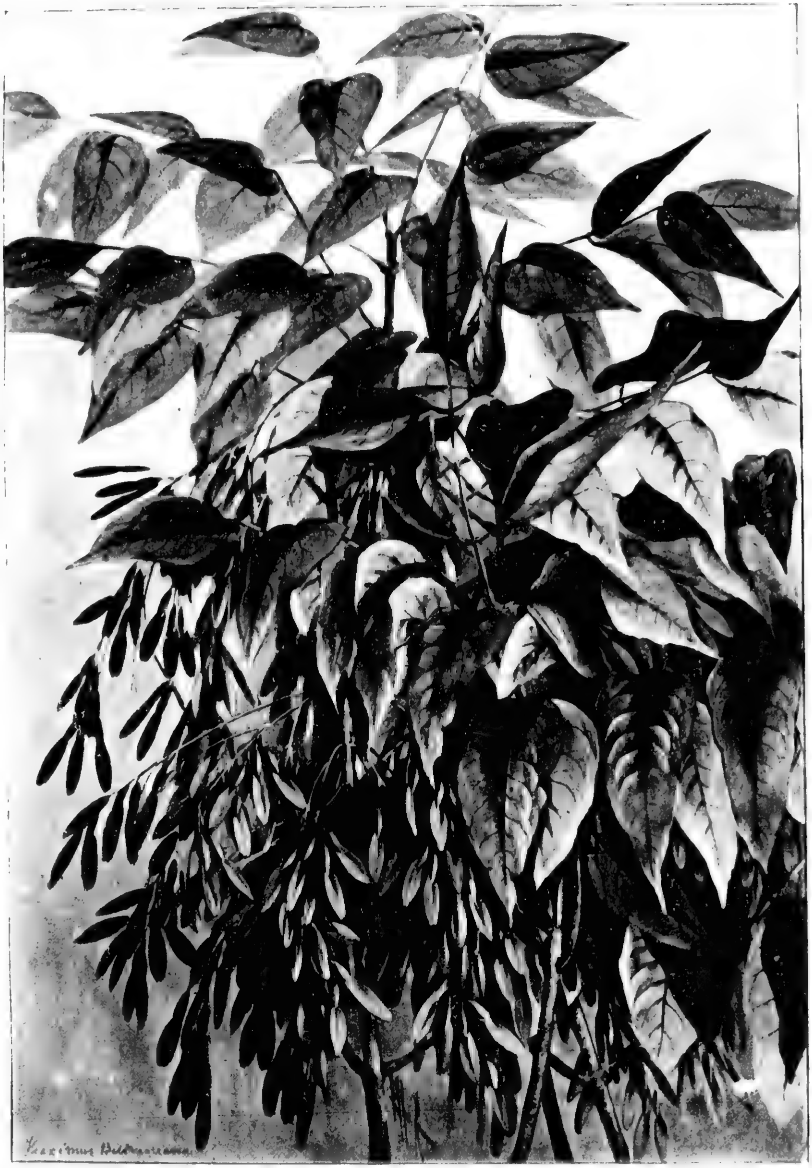

PLATE LXIX BILTMORE ASH. *Fraxinus Biltmoreana.*

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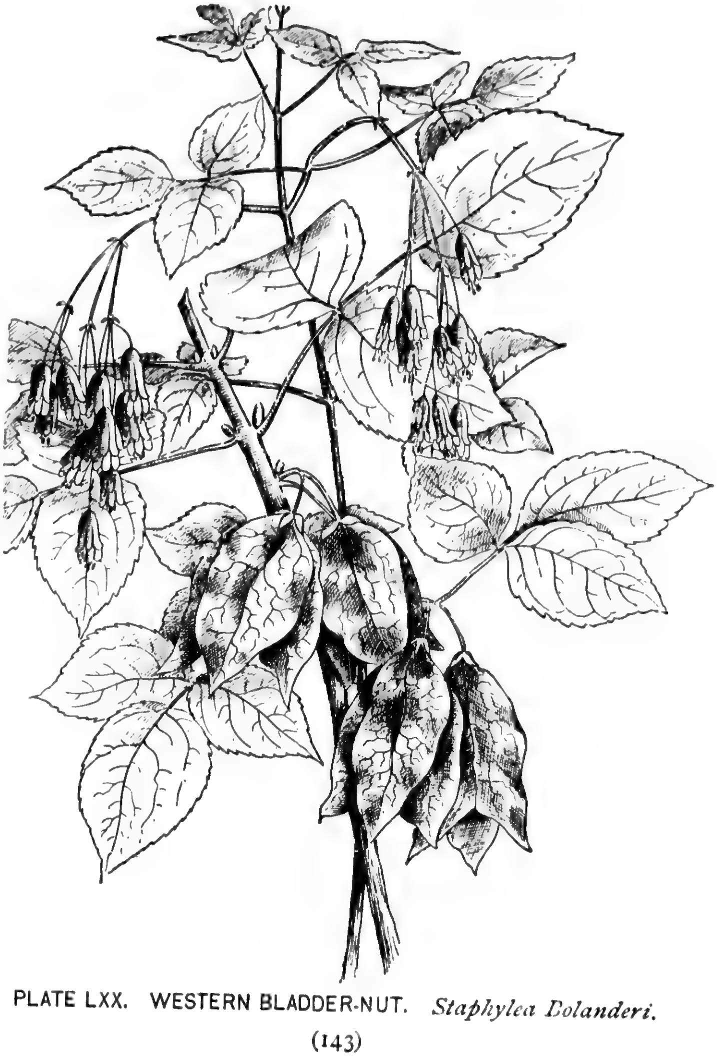

PLATE LXX. WESTERN BLADDER-NUT. *Staphylea Bolanderi.*

WESTERN BLADDER-NUT. (*Plate LXX*)

Staphyléa Bolánderi.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Staff-tree.	*Erect; branches, stout.*	*About 3-6 feet.*	*"Pacific forests."*	*April.* *Fruit: July.*

Branches: reddish brown, the new growth light yellow or green. *Leaves:* compound; opposite; three-foliate; with long petioles; the leaflets broadly oval; abruptly pointed at the apex, and pointed or blunt at the base; serrate; glabrous. *Flowers:* greenish white; perfect; regular, and growing in drooping, terminal panicles. *Sepals:* five. *Petals:* five. *Stamens:* five; exserted. *Pistil:* one, with three styles. *Fruit:* large; bladder-like, and containing from one to four flattened seed in each cell.

To follow the woods and streams with eyes alert to all that is growing is to live upon the brink of discovery, and when a rare or unknown plant is found there is a certain dread and excitement lest one may have been deceived, and a fear that the illusion will be shattered by some one pointing out that it has been known and written about in ages past.

The specific name of the western bladder-nut commemorates the collector who first discovered it growing at McCloud's Fork of the Sacramento River. It is one of the rarest shrubs of the Pacific coast; and it is not thought that it has been introduced into cultivation. Even more interesting than the fine delicate flowers are the curious bladder-like seed vessels. That they have sprung from things so small seems indeed a mystery.

ELDER. (*Plate LXXI.*)

Sambùcus Canadénsis var. Mexicàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Honeysuckle.	*Round-topped, compact.*	10-30 *feet.*	*Western Texas to California.*	*March-July.*

Bark: brownish red; broken in horizontal ridges. *Leaves:* compound; opposite; odd-pinnate; with pubescent stalks and five ovate-lanceolate leaflets, pointed at the apex and wedge-shaped at the base; sharply serrate, and becoming entire at the base; yellow-green; thick; pubescent along the veins. *Flowers:* white; minute; growing in large, flat cymes. *Fruit:* a blue-black drupe; juicy, and having no bloom.

There are, perhaps, few that are not familiar with the common elder, the shrub about which cluster so many old traditions. In western Texas, and extending to California, the vari-

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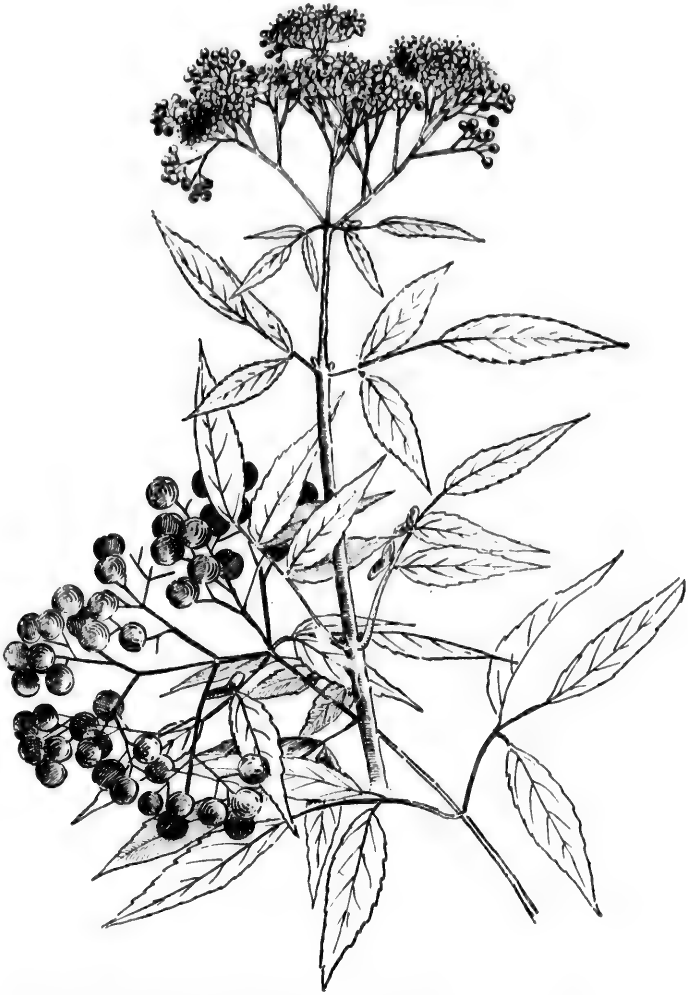

PLATE LXXI. ELDER. *Sambucus Canadensis var. Mexicana* ety called Mexicana differs from it in becoming arborescent in its habit. It is a very ornamental tree, free from objectional features, and about houses it is much planted for shade. Its fine light foliage makes it desirable for the purpose. The Indians and Mexicans assiduously gather its fruit every year and have many ways of preparing it as food, which, it is said, they keenly relish.

S. Canadénsis, sweet elder or elderberry, is a well known woody shrub, which commonly grows from five to ten feet high. Its flowers and cymes of deep purple fruit are possessed of medicinal properties. The leaves when crushed emit a heavy scent.

SWEET BUCKEYE. BIG BUCKEYE. YELLOW BUCKEYE. (*Plate LXXII.*)

Æsculus octándra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Soap-berry.	*Compact; branches, slightly pendulous.*	30-90 *feet.*	*Along the Alleghanies to Ga. westward to Iowa.*	*April-June.*

Bark : dark brown ; separating into thin pieces. *Branchlets :* orange-brown when young. *Leaves :* palmately-compound ; opposite, with usually five or sometimes seven long, oval, or elliptical leaflets, taper-pointed at the apex and base; sharply serrate ; glabrous above and pubescent along the ribs underneath. *Flowers :* pale yellow ; growing on short pedicels in close panicles. *Calyx :* oblong ; with five points. *Corolla :* with five petals, the lateral ones long, narrow at the ends and rounded. *Stamens :* shorter than the petals. *Fruit :* a round, green husk ; uneven on the surface but without prickles and enclosing one or two large brown nuts.

In the outline of the buckeyes there is something particularly compact and well-regulated, and their symmetrical leaves cling together as though to shut out the intrusion of other ideas than their own. We can hardly fancy the boughs of these trees waving poetically ; they are much too conventional. The leaflets, as can be seen from a comparison of the illustrations, are very differently shaped from those of the horse-chestnut, which is an introduced tree. The sweet buckeye is so named because the odour of the meat of its nut is not peculiar like that of others of the genus. It is a handsome and shapely tree,

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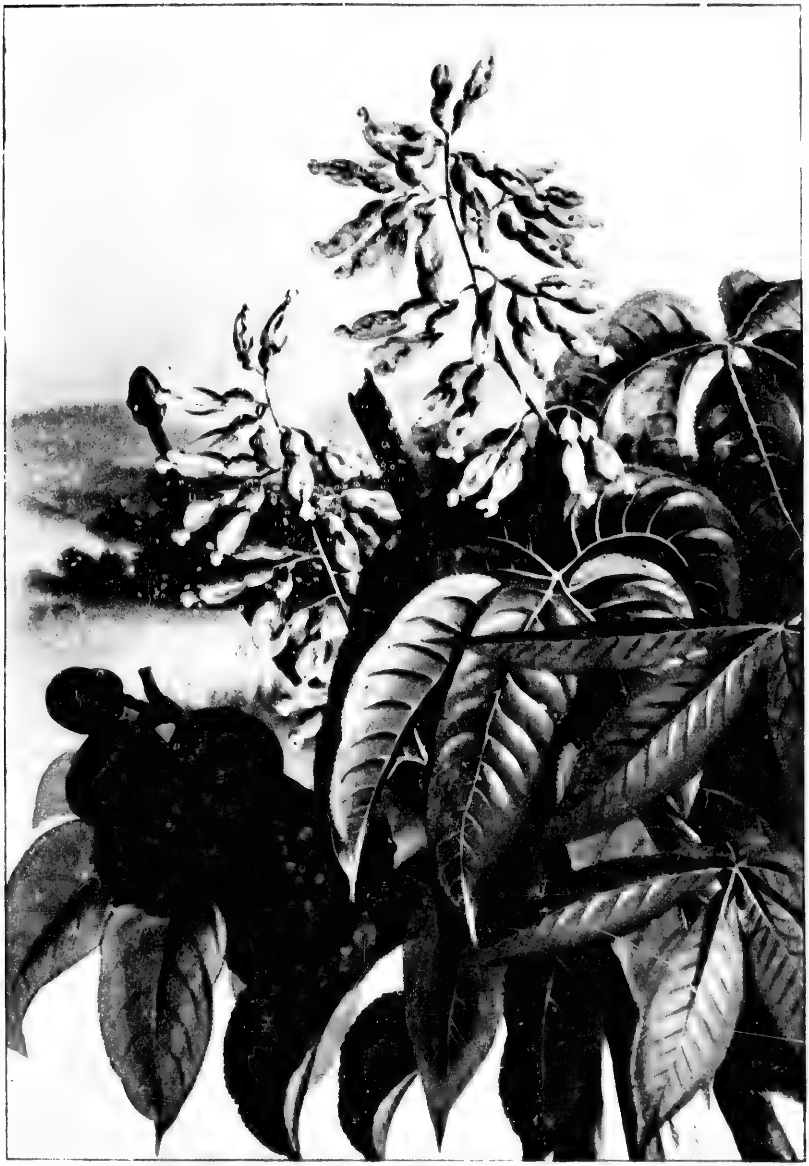

PLATE LXXII. SWEET BUCKEYE. *Aesculus octandra.*

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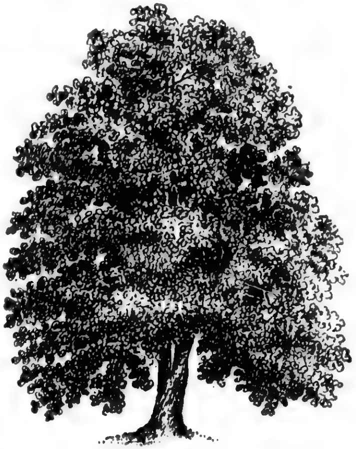
and appears well in cultivation. In the early spring when it is covered with its yellow flowers it seems to have suddenly become quite frivolous. In the southwest the tree is hardly more than a shrub. Its wood is creamy white, strong, and difficult to split.

A. octàndra hybrìda, purple sweet buckeye, is readily distinguished from the preceding species in its season of bloom, as its flowers are purple or dull red. The leaves, also, are very downy on their under surface, and the bark of the tree is lighte in colour.



Æ̀sculus octàndra.

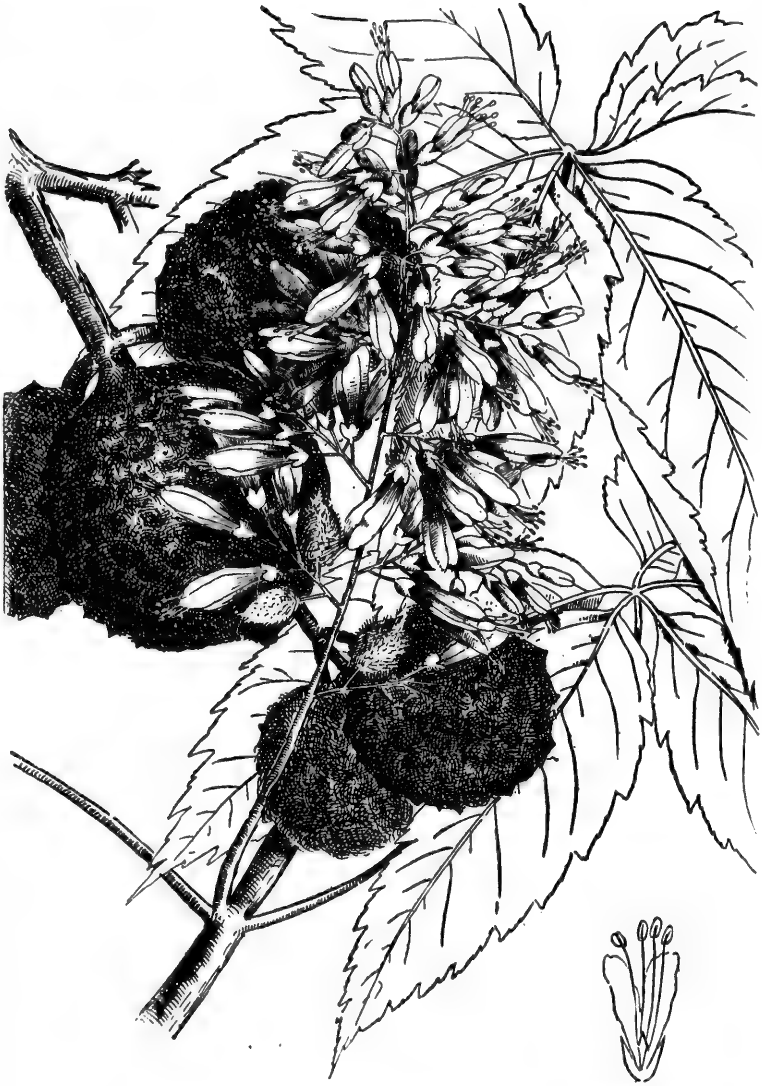
OHIO BUCKEYE. FETID BUCKEYE. (*Plate LXXIII.*)

Æ̀sculus glàbra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Soap-berry.	*Spreading; branches, slender.*	18-35 *feet, or higher.*	*Along the Alleghanies to Ala. and westward.*	*May.* *Fruit: Oct.*

Bark : grey; furrowed and separating into thin scales; odour, disagreeable. *Leaves :* palmately-compound; opposite; with slender petioles and five or seven long oval leaflets, taper-pointed at the apex and base; unequally serrate; yellowish green above, paler below; almost glabrous at maturity. *Flowers :* not showy; pale yellow green; growing in a short panicle; pubescent. *Corolla :* with four erect and rather uniform petals having claws. *Fruit :* two smooth nuts, enclosed in a green round husk with prickles when young.

Although this is not a common tree it has grown so extensively in Ohio that the name "the Buckeye State" has been the outcome. It is also hardy in New England. In low, moist ground and river bottom lands it finds its natural habitat. For almost every contrivance of man it seems as though there



Enlarged flower.

PLATE LXXIII. OHIO BUCKEYE. *Æsculus glabra.*

Æsculus Californica.

were a tree which bore the necessary and best adapted wood. Such is the provision and forethought of nature. The wood of the genus Æsculus is better than any other for the making of artificial limbs.

A. Californica, the California buckeye, is usually a small tree. The accompanying diagram was taken from a specimen that had attained a great size and rounded, compact proportions. It bears five leaflets that are slender stalked.

Trees Preferring to Grow in Rich Soil: Forests and Thickets.

It was twilight in the denser woods,
All the birds had ceased to sing,
And a wondrous stillness filled the air
As each vine did closer cling.

Not a leaf was stirred on all the trees,
'Twas as though their trunks were stone.
On the sultry air all there seemed carved;
Too heavy and sad to moan.

Had the earth just rung for evening prayer,
The twilight breeze lulled to sleep?
Or was it a painting, where all is dead,
And shadows are long and deep?

No voice came the question to answer,
Nor sign from the cloudless sky;
'Till frightened perhaps by the calmness,
Sailed high a white butterfly.

CUCUMBER TREE. MOUNTAIN MAGNOLIA.

(*Plate LXXIV.*)

Magnòlia acuminàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Magnolia.	*Pyramidal, slender.*	60-90 *feet.*	*Southern N.Y. southward and westward.*	*April-June.*

Bark: dark; rough. *Branchlets:* pubescent. *Leaf-buds:* silky; pubescent. *Leaves:* simple; alternate; petioled and scattered along the branches; oblong, pointed at the apex and rounded at the base. Dark green above, lighter below

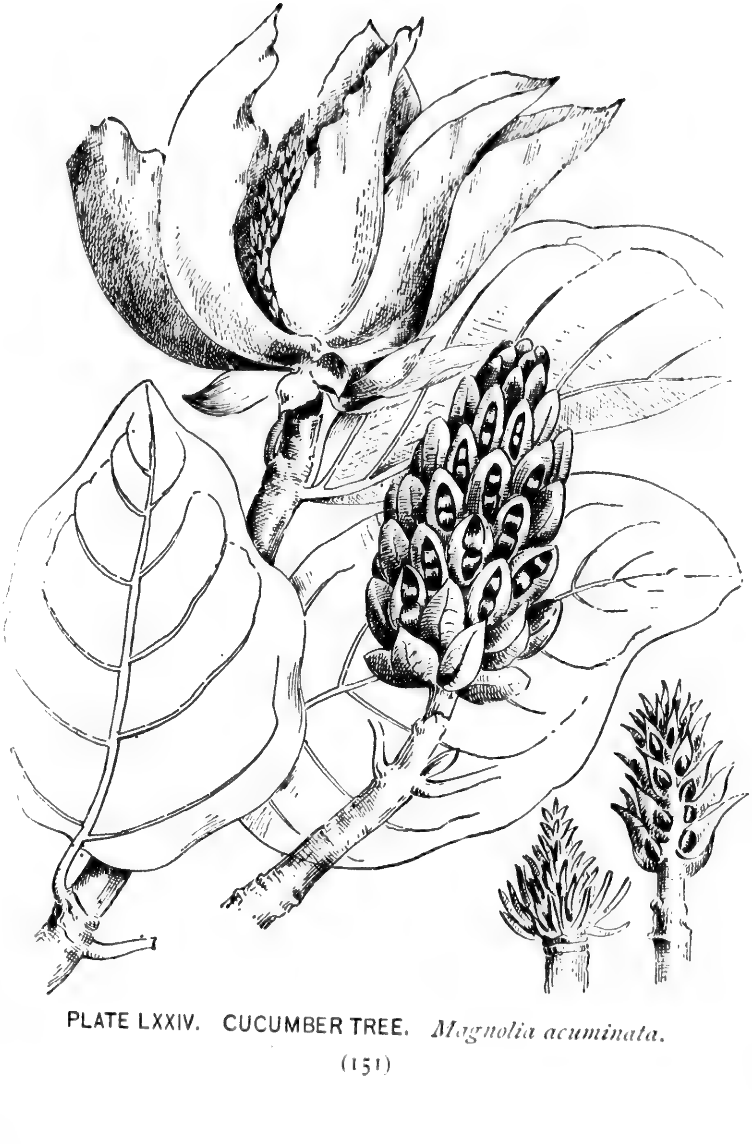


PLATE LXXIV. CUCUMBER TREE. *Magnolia acuminata.*

and pubescent. *Flowers:* three to six inches in diameter; terminal; solitary. *Calyx:* reflexed. *Corolla:* pale greenish yellow; fragrant, with six large obovate, narrow pointed petals. *Fruit:* large; ovate; glabrous; becoming rose coloured when ripe. *Seeds:* orange-red and hanging when released from the pods by fine white filaments.

When we wander through a strip of woodland where the soil is rich and the atmosphere feels as though it were a shroud of humid vapour, we may look about among the white ash, the white oak and the sugar maples for the fragrant bloom of Magnolia acuminata. But it is generally a rare find, and it is not sufficiently common to be much associated with the forests. Its growth is most luxurious in the valleys at the bases of the mountains of North Carolina and Tennessee. At all seasons of the year it is a notable tree, although it can not be compared to the great-flowered magnolia, which has, however, attained so leading a place in beauty's ranks that it is perhaps unjust to use it as a standard for others. The resemblance of the tree's fruit when green to a small cucumber is responsible for its English name. Magnolia acuminata has been used with much success as a stock on which to graft *Magnolia Virginia* and the magnolias of Eastern Asia. They then grow more freely than when left entirely dependent upon themselves. The wood of the tree has been used in cabinet work; but generally speaking that of the whole genus, excepting *Magnolia fœtida*, is too soft and spongy to be of any great value.

M. cordàta, yellow cucumber tree, is a variety of this species which is widely cultivated. It is hardy as far northward as Boston. A most beautiful effect is produced by it when its lemon-coloured flowers are pushing out of the buds.

SMOOTH AZALEA. TREE AZALEA. (*Plate LXXV.*)

Azàlea arborèscens.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Heath.	*Rounded.*	8-20 *feet.*	*Southern Penn. to North Carolina.*	*June, July.*

Bark: dark, tinged with red. *Leaves:* simple; alternate; petioled; obovate, acute at both ends, with entire margins which are delicately fringed. Bright green and lustrous above, paler and glaucous underneath; in drying fragrant. *Flowers;* rose coloured or white; very fragrant; growing in terminal

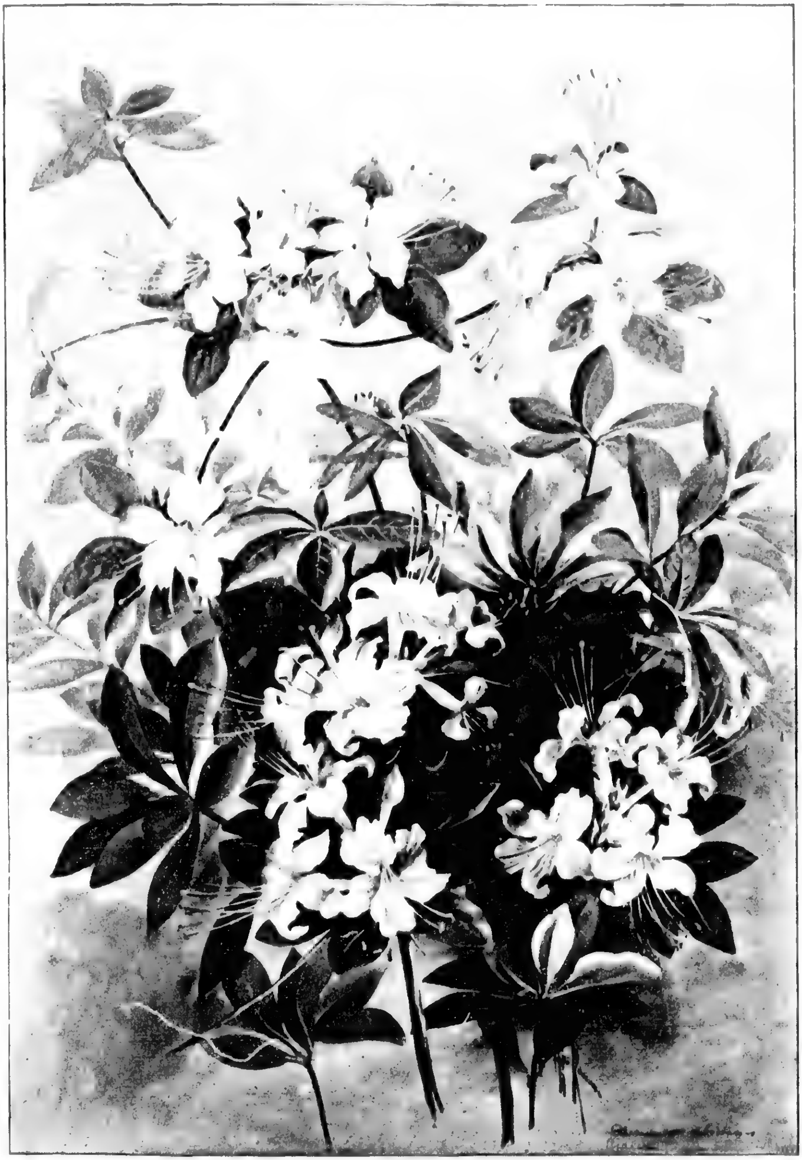


PLATE LXXV. SMOOTH AZALEA. *Azalea arborescens.*

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clusters and appearing after the leaves. *Calyx:* five-lobed; conspicuous. *Corolla:* funnel-form with five somewhat irregular lobes; viscid. *Stamens:* red; five; protruding. *Pistil:* one with a red style; protruding. *Capsules:* oblong.

Such a wealth of beauty and fragrance is shed about by this lovely azalea in its season of bloom that its presence is hailed by every breeze that blows. Often when a strip of woodland is entered, and the dark trees cling together as though to shut out the light of day, the perfume laden air bespeaks that by following its guidance the azalea is to be found. Steps are taken and the fragrance becomes stronger. Then as a burst of rosy light the blossoms reveal themselves. Thousands of bees hum about them and guard the tree from hands that would carry its treasures away. Between this tree and the beautiful shrubs *Azalea viscosa* and *Azalea nudiflora* there is much that is similar, although they never become arborescent in their habit. Our familiarity with them, however, will help us to appreciate this most charming relative of the south. It has appealed strongly to horticulturists, and is much seen in greenhouses.

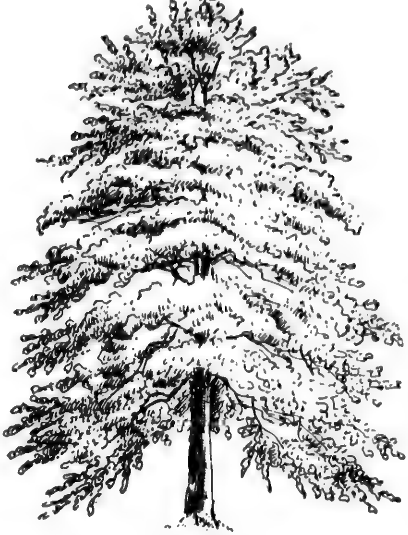
AMERICAN LINDEN. BASSWOOD. WHITEWOOD. WHISTLE-WOOD. (*Plate LXXVI.*)

Tilia Americàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Linden.	*Rounded, tapering toward the summit.*	60-80-120 *feet.*	*Northward and southward to Virginia and westward.*	*May, June.*

Bark: dark brown deeply ridged vertically, and separating into thin scales. *Branches:* light grey or brown, terminating in green. *Leaves:* four to five inches long; simple; alternate; slender-petioled; rounded in outline with abruptly and conspicuously pointed apex and cordate base; one side of the leaf generally less developed than the other; sharply and irregularly toothed; dark green, smooth and glossy above; pubescent underneath, and especially so in the angles of the light coloured and prominent ribs. *Flowers:* cream colour; fragrant; growing under the leaves in a cyme on a long, slender peduncle that hangs from the centre of the midrib of a leaf-like axillary bract which is apple-green, lanceolate and smooth. *Sepals:* five; pubescent. *Petals:* five. *Stamens:* numerous, and adhering in clusters of five to a petal-like scale before each petal. *Fruit:* greenish grey; round; downy, and resembling small peas when young; the style and five-toothed stigma projecting from its top. *Seeds:* ten.

A bright but unfortunately unknown poet has said that "the loveliest rose in the world is opportunity." And it is opportunity which we must court when studying the trees. Usually it is a mistake to pass one by, especially when it is in bloom, with the thought that we will study it when later we return. Later our path may lead us into unexpected places, where we shall find ourselves engrossed by other things; and when, perchance, we do return to the tree that we have borne in mind, we see that its blossoms have perished and a new order of things is in progress.



Tilia Americàna.

Either in bloom or in fruit the American linden is an interesting study. It appears to be hung with two distinct shades of green; the dark green of its leaves and the shimmering, light apple-green of its curious bracts. The dainty, little blossoms fall early in the season, and their place is taken by many precise, pert-looking balls of fruit. They nod and sway with the breezes for a long time. Finally, the bracts lose their colour, become scale-like and gradually fall. The carpet they then spread under the trees and the out-flying ones are all that remain in the autumn to testify that anything unusual has occurred.

The wood of Tilia Americana is brownish red and soft. It is free from blemishes and knots, and is, therefore, desirable to use for the panelling of carriages. Much care is necessary when manipulating it, as it has a tendency to crack badly. The inner bark is extremely tough, from it coarse rope and mats are made.

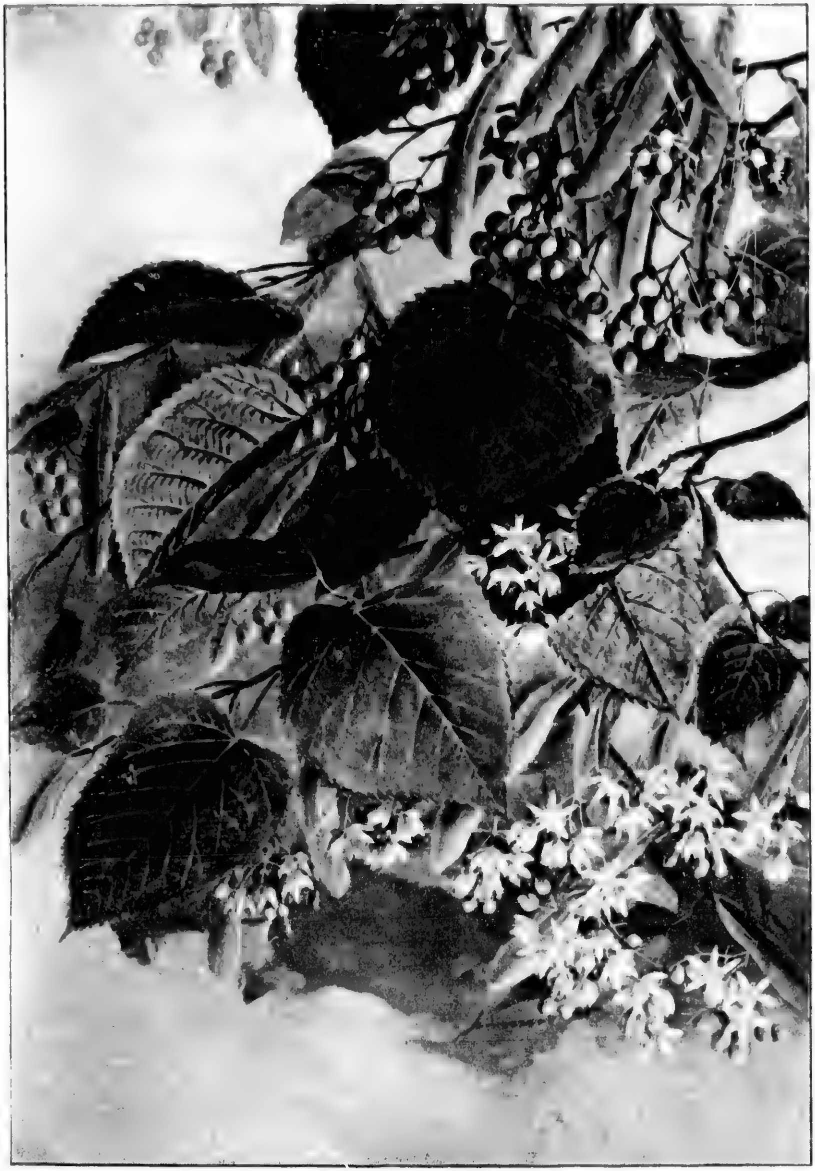


PLATE LXXVI. AMERICAN LINDEN. *Tilia Americana.*

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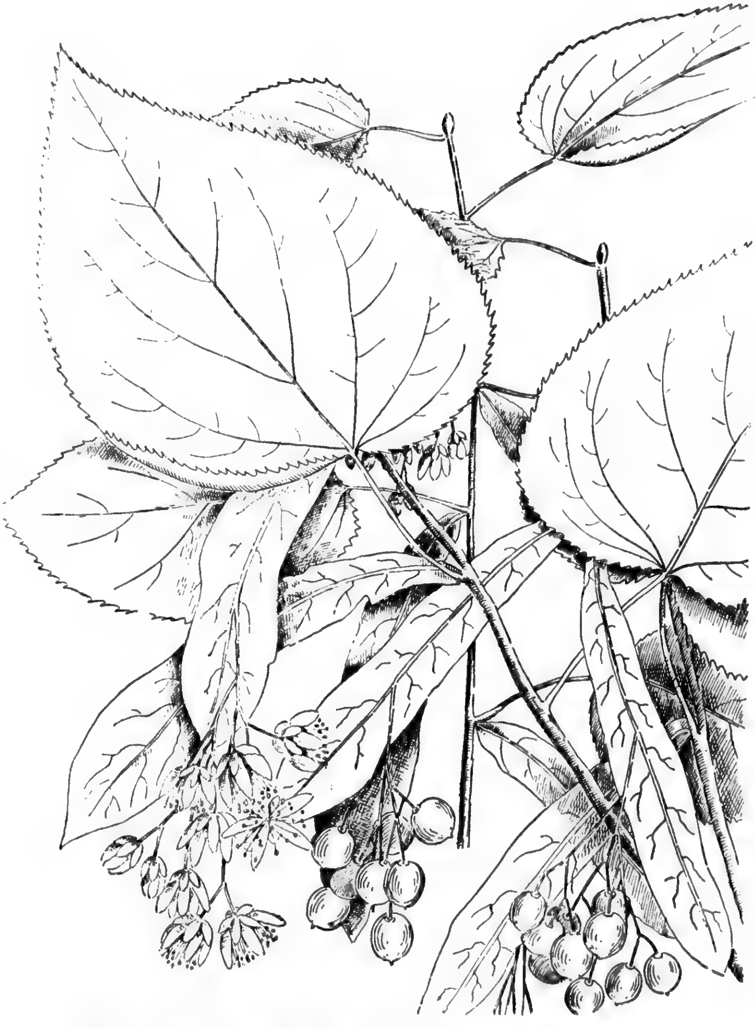

PLATE LXXVII. WHITE BASSWOOD. *Tilia heterophylla.*

T. heterophylla, (*Plate LXXVII*), white basswood, linden bee-tree or Wahoo, differs from the foregoing species in having larger leaves which are covered underneath with a silvery white down and through which show purple ribs. This delicate feature adds much to the beauty of the leaf. The height of the tree is from about fifty to sixty feet. It inhabits the mountains of Pennsylvania and occurs southward to Florida and westward to Illinois. Recently it has been found in Central New York. On the slopes of the mountains in Tennessee it is seen in a great state of development. It is always a very beautiful tree. Northward it is unfortunately rare even in cultivation.

T. pubescèns is again distinguished by its comparatively small leaf and its thinness. Much of the pubescence which is conspicuous along the ribs and in their angles is lost at maturity. The bracts, to which are attached the peduncles of the blossoms, are sessile, and they are most often rounded at the extremities. The tree is found growing in rich soil from Long Island to Florida, and westward to Texas.

T. Europæa, European linden, is commonly seen planted about dwellings, and grows to a height of about thirty-five or forty feet. There are varieties of it which are similar to both the native small-leaved and large-leaved species. Their stamens, however, are free from scales and the trees have pyramid-shaped heads.

WILD RED CHERRY. BIRD CHERRY. PIN CHERRY. PIGEON CHERRY. (*Plate LXXVIII.*)

Prùnus Pennsylvánica.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Plum.	*Head, narrow or rounded; branches, horizontal.*	20-40 *feet.*	*Northward to Ga. and to Iowa and westward.*	*April, May.* *Fruit: June, July.*

Bark: reddish brown and covered with enlarged orange-coloured dots, when old inclined to peel about the trunk into thin, papery sheets. *Stipules:* early falling. *Leaves:* simple; alternate, or growing in clusters of five with slender, grooved petioles; oval, with pointed apex and pointed or rounded base; finely serrate; netted-veined; thin; bright green; smooth and lustrous above; paler

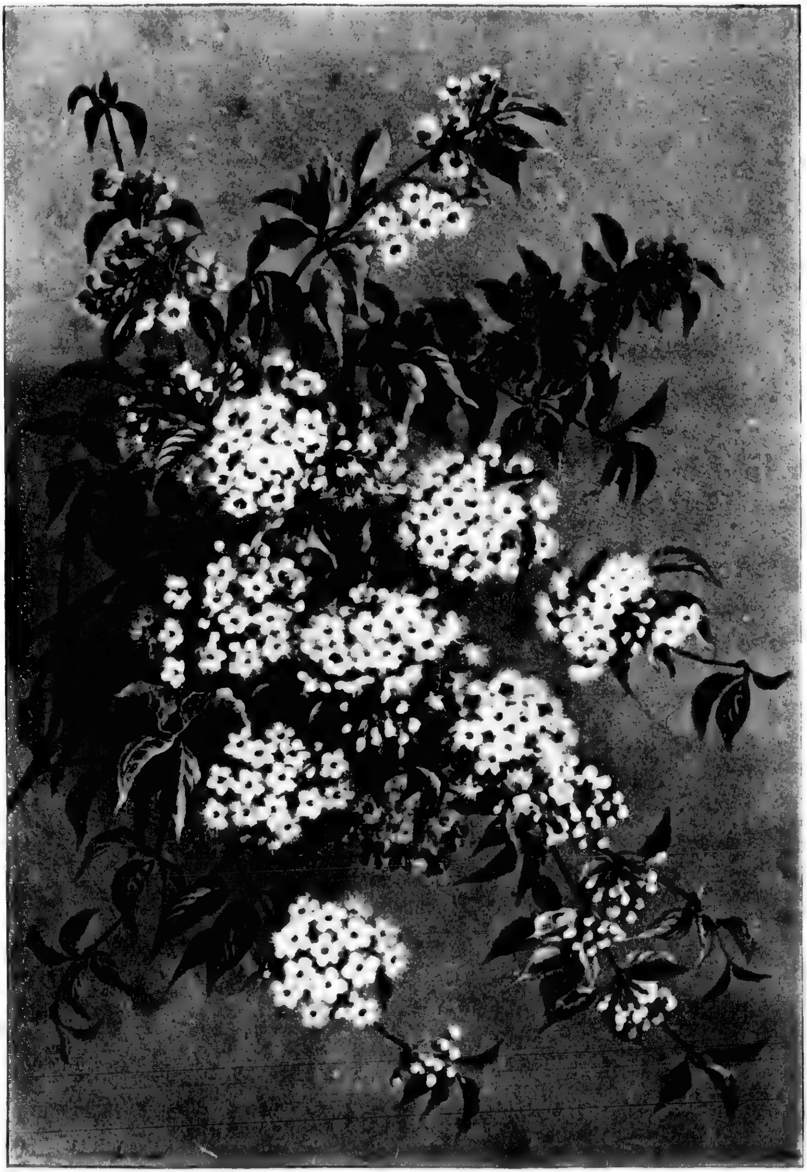

PLATE LXXVIII. WILD RED CHERRY. *Prunus Pennsylvanica.*

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below, with minute white pubescence; aromatic. *Flowers:* white; almost scentless; growing in umbels of four or five from long, slender pedicels from separate, lateral buds. *Calyx:* with five recurved sepals. *Corolla:* of five rosaceous petals. *Stamens:* numerous, of different lengths. *Pistil:* one. *Fruit:* a light red drupe; round, about the size of a full-grown pea, and tipped with a remnant of the style; sour.

In the early spring woods, when but feeble suggestions are to be seen of the swelling foliage and a full-grown leaf is an expectation, it is very pleasant to find the red cherry. At all seasons of the year there is a sprightly, crisp charm about the tree; but it then claims our attention as being one of the first that have ventured into bloom. The delicate, white blossoms unfold with the leaves, or when they are partly grown, and might almost be mistaken for belated snowflakes that are slowly dropping through the branches. As they fall away the fresh, green leaves which have been folded together lengthwise in the bud begin to spread themselves. They ever retain a wavy, curving edge. In the autumn they turn a bright yellow. The tree germinates readily, and its seeds are deposited by birds that greedily eat its fruit. In many places the red cherry is abundantly seen among the shrubbery of the waysides, although it then seldom attains a full development. The tree is short lived. In the fruit herbalists have found medicinal properties.

P. Mahàleb, perfumed cherry, or Mahaleb, is a small tree, or sometimes a shrub which is becoming frequent in this country along the waysides and in waste places. It comes from Europe where its wood is largely used in cabinet work. The particular charm about it is the fragrance of its white blossoms. They grow in corymbed clusters on the young, leafy branches of the season, and unfold at the same time as the smooth, ovate leaves. The drupe is almost black and tinged with red.

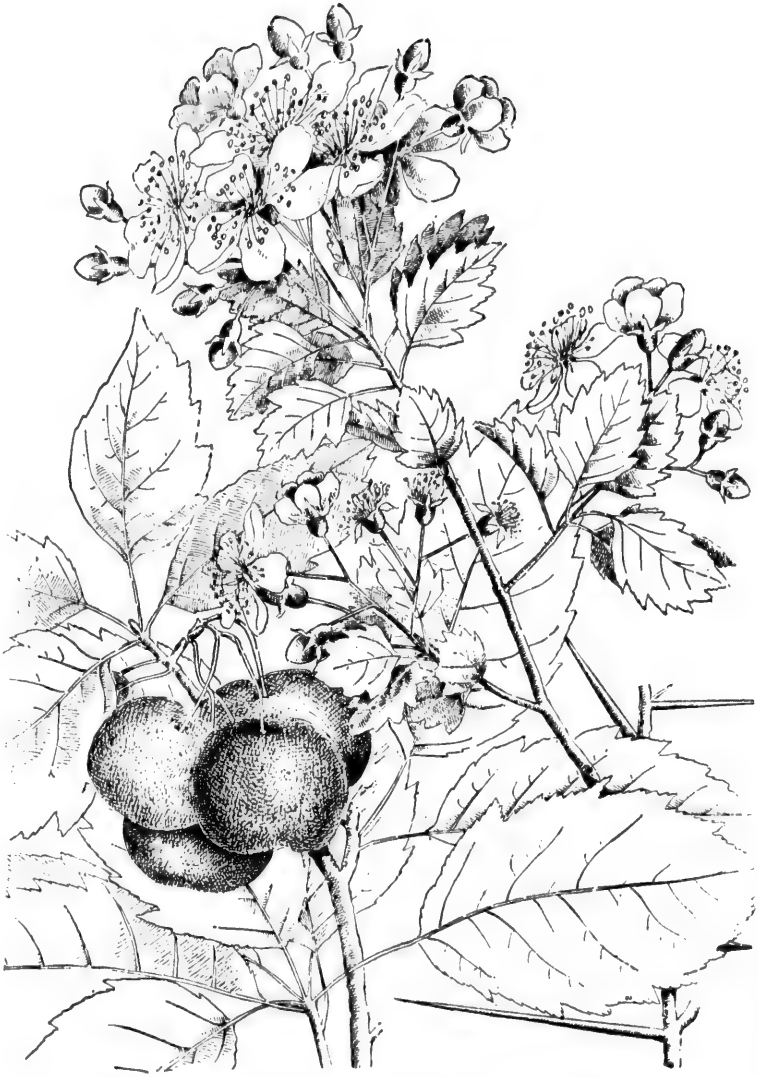

PLATE LXXIX. AMERICAN CRAB-APPLE. *Malus coronaria.*

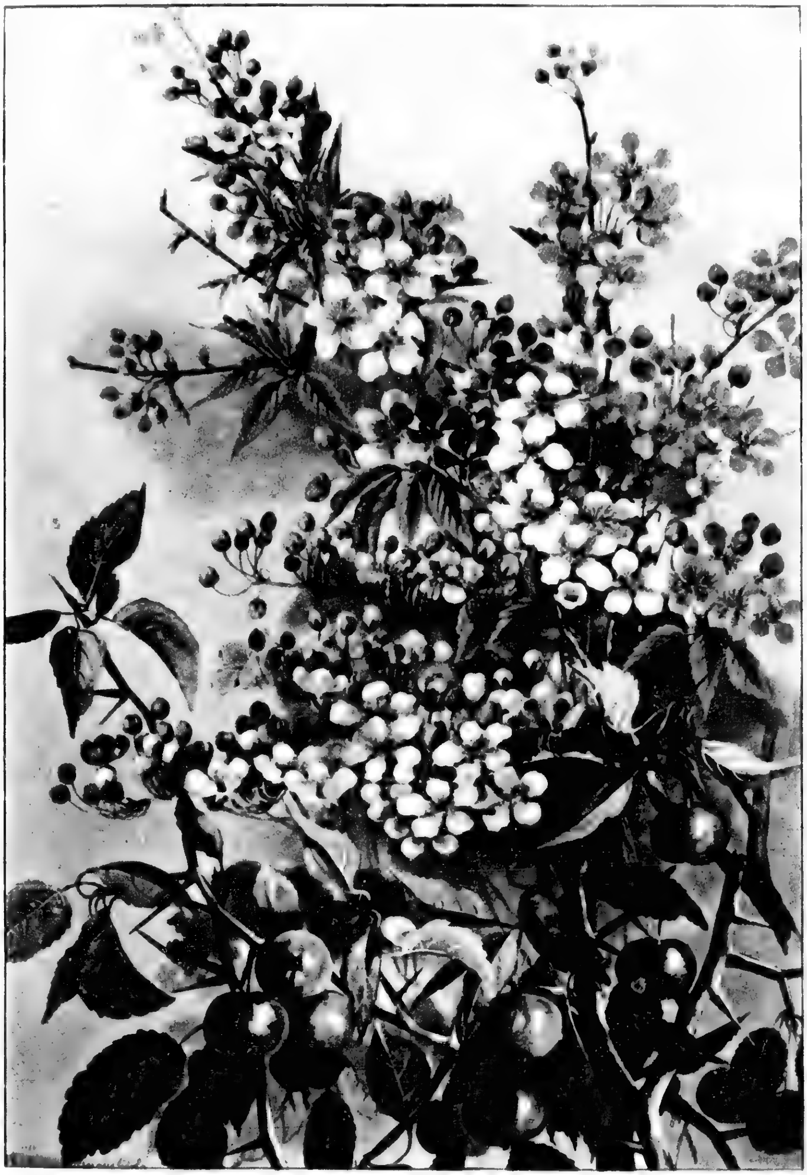

PLATE LXXX. NARROW-LEAVED CRAB-APPLE. *Malus angustifolia.*

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AMERICAN CRAB-APPLE. SWEET-SCENTED CRAB TREE. (*Plate LXXIX.*)

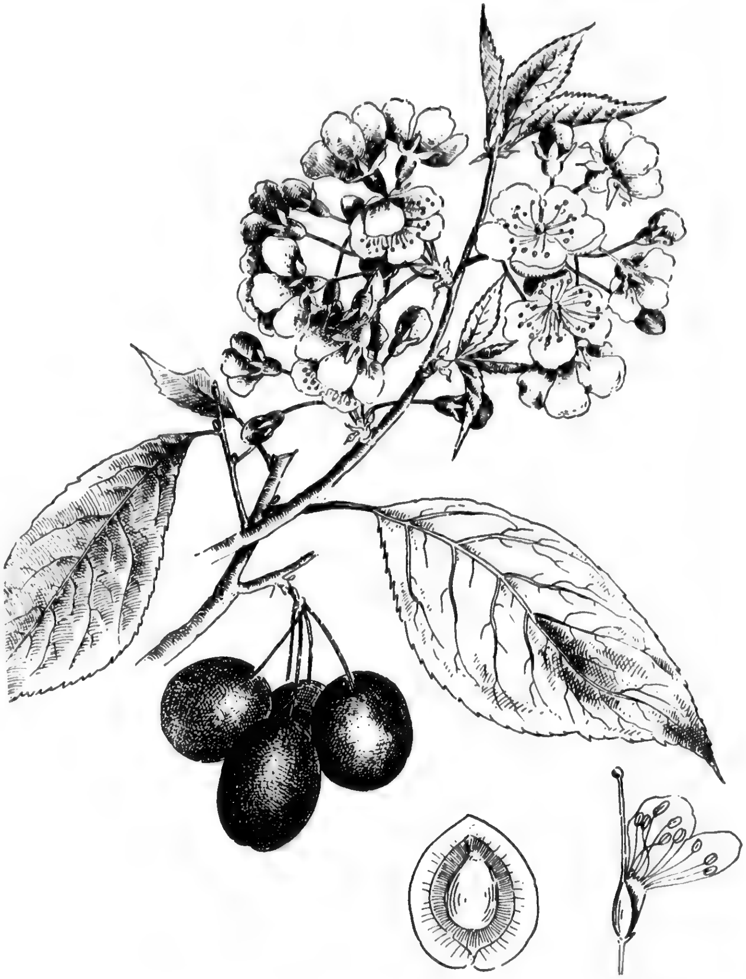
Màlus coronària.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Head, open; branches, spreading.*	10-25 *feet.*	*Ontario to Mich., southward to So. Carolina.*	*April, May.* *Fruit: Sept.*

Bark: reddish brown, the outer layers separating into thin plates. ***Stipules:*** early falling. ***Leaves:*** simple; alternate; with slender, downy petioles; ovate, with pointed apex and rounded or slightly cordate base. Edged toothed when mature, and frequently appearing as though having two side lobes. Bright green above; paler below; at maturity glabrous. ***Flowers:*** large; rose coloured, or white; fragrant; growing in loose, terminal umbels and appearing after the leaves. ***Calyx:*** pubescent. ***Corolla:*** of five petals. ***Stamens:*** numerous. ***Pistil:*** one. ***Fruit:*** a yellowish-green pome; very fragrant; and covered with a waxy substance; sour.

Who that is acquainted with the odours of nature does not lift his head in the air to inhale more freely the delightful fragrance of this little tree and then look about to locate its presence? The deeply-hued, brilliant blossoms are particularly lovely and enliven all the rusty and misty green tones which hover over the earth so early in the season. About the fruit, however, there is a sly deception; it appears as though it might be very good and thus many are led to taste of it, when the disillusion is sad indeed. By a little judicious management housewives make it into crab-apple jelly and preserves. Cider also is made from the fruit. As a shrub the American crab-apple is rather distorted and bushy in outline; but when seen as a small tree in cultivation hardly one more beautiful can be imagined. Its fruit then becomes tinged with red and yellow.

M. angustifòlia, narrow-leaved crab-apple, (*Plate LXXX.*) differs from the preceding species in that its leaves are narrowly-oblong, or lanceolate. It mostly inhabits the south and west and, what is rather unusual from its locality, bears smaller flowers and fruit than the northern one. The coloured illustration shows clearly its lovely spray of pink blossoms and its round, green fruit. Its wood is closely grained and heavy. It is made into handles for tools and into many small articles.



Drupe, laid open. *Section of flower.*

PLATE LXXXI. CANADA PLUM. *Prunus nigra.*

CANADA PLUM. HORSE PLUM. (*Plate LXXXI.*)

Prùnus nìgra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Plum.	*Head, narrow; branches, upright.*	20-30 *feet.*	*New England to Wisconsin.*	*May.* *Fruit: August.*

Bark: light brownish grey; thin and separating into sheets. *Stipules:* lanceolate, or lobed and early falling. *Leaves:* simple; alternate, with stout petioles which have one or two red glands by the blade; oval; pointed at the apex and obtuse or slightly cordate at the base; coarsely serrate; when young pubescent and tinged with red; smooth at maturity; not lustrous. *Flowers:* white; turning as they fade to pink; growing on long, reddish pedicels in lateral umbels and opening before the leaves. *Fruit:* an orange-red drupe; oval; the skin thick. *Stone:* clinging closely to the flesh.

When this tree of the plum family is in bloom or hung with its translucent, radiant fruit it seems to elicit continual praise. In its wild state it is a thorny tree and the long spikes add much to its rugged, picturesque beauty. When it, however, resigns its cares in life into the hands of the horticulturist these thorns become eliminated. Their original purpose which was to protect the fruit from the ravages of small animals is superfluous in the modern garden. In fact pomologists have done much in the way of diminishing them by budding with other stock and selecting buds from those branches that have the fewest thorns. For in cultivation thorns are no doubt an objection to a tree. Pickers are annoyed by them, and during wind storms they often puncture the fruit so as to render it unfit for the market. Throughout the northern New England states and in Canada the tree is widely cultivated, and is used as a stock upon which to graft the domestic plum. As is true of many of the family its fruit is quite prone to vary. Much of it finds its way into the markets. It is eaten raw by many and is excellent for stewing and making into preserves.

The usual habitat of the Canada plum is in rich, alluvial soil. It also grows with the hawthorns in thickets, or by the borders of forests and occasionally in the neighbourhood of streams.

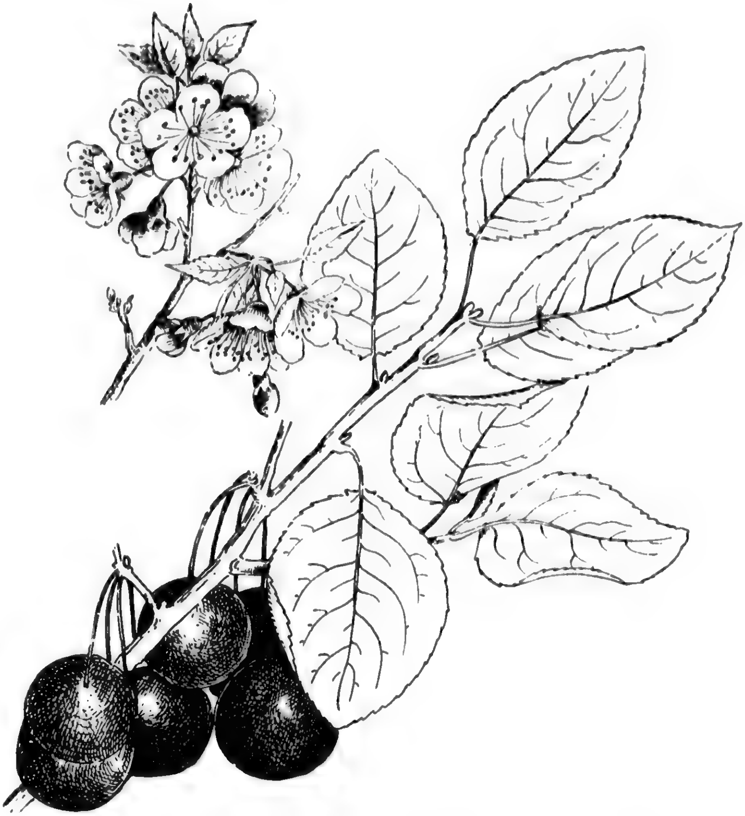


PLATE LXXXII. WILD PLUM. *Prunus subcordata.*

WILD PLUM. (*Plate LXXXII.*)

Prùnus subcordàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Plum.	*Branches, horizontal.*	10-25 *feet.*	*Oregon and California.*	*March, April,* *Fruit: Aug., Sept.*

Bark: greyish brown; rough. *Branchlets:* bright red and marked with pale lenticels. *Leaves:* simple; alternate, petioled; broadly-ovate, bluntly pointed at the apex and slightly cordate or squared at the base; sharply and singly or doubly serrate; dark green and glabrous above only slightly pubescent underneath at maturity. *Flowers:* growing in nearly sessile umbels and appearing before the leaves. *Calyx:* campanulate, with five pubescent lobes. *Corolla:* with five white, rounded petals. *Fruit:* dark bluish, red or yellow; somewhat acrid but pleasantly flavoured.

About the autumn colours in Oregon, Mr. E. W. Hammond writes: "The wild plum sometimes becomes a small tree, but is seen generally as a small shrub three, four or five feet in height. It often sets the whole country-side ablaze in the autumn with the abundance of its scarlet and crimson colours, mingled, of course, with red and yellow, and garnished with a sprinkling of green."

In bloom it is also a gay sight, as are all of its kindred when their showers of delicate, flake-like petals alight. In fading those of the wild plum turn to pale pink, and almost before the earth can have accustomed itself to their presence they steadily fall.

The tree or shrub is full of vigour and yields in cultivation an abundance of fruit. Upon it several European species of plums have been grafted with excellent results. West of the Sierra Nevada mountains in California and Oregon, where Prunus subcordata is well known, its fruit is yearly sought and made into delicious jellies and jams.

HAWTHORN. SCARLET THORN. RED HAW.

(*Plate LXXXIII.*)

Cratæ̀gus coccinea.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Spreading; branches, crooked.*	10-30 *feet.*	*New Foundland westward, southward to Florida.*	*May.* *Fruit: Sept.*

Bark: brown or ash colour; broken in thin plates. *Branchlets:* silver-green; glimmering. *Thorns:* one to two inches long; curved. *Leaves:*

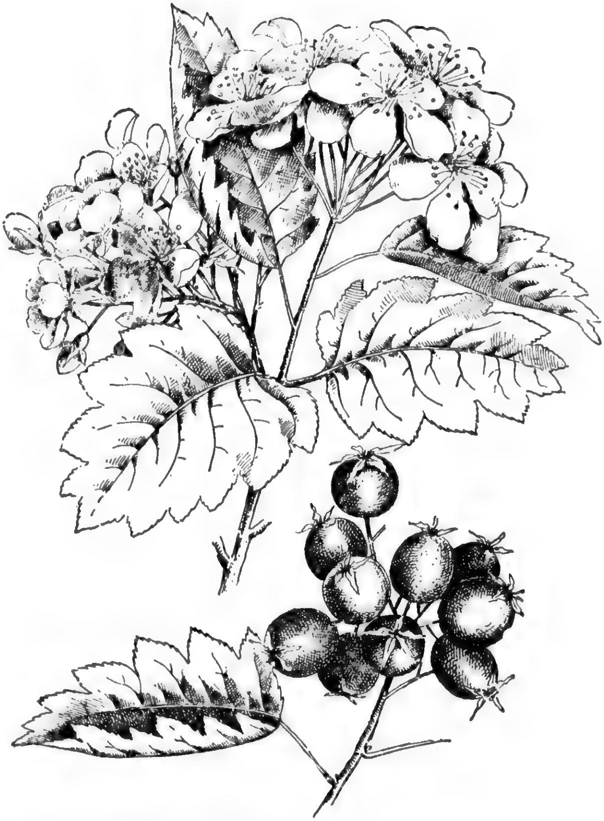


PLATE LXXXIII. HAWTHORN. *Cratægus coccinea.*

simple; alternate; slender-petioled in alternate bunches; rounded-ovate, with pointed apex and pointed or slightly heart-shaped base; sharply and unevenly toothed or forming small lobes; deep green tinged with red, shining and glabrous; membranous. *Flowers:* large; white, pink or reddish; clustered in a corymb; odour, unpleasant. *Calyx:* urn-shaped; five-cleft. *Corolla:* of five rosaceous petals. *Stamens:* numerous. *Pistil:* one with from three to five styles. *Fruit:* bright scarlet; ovate; not edible.

Among the hawthorns there are a number of beautiful trees with close, fine foliage and dainty, cherry-like blossoms which unfold an abundance of brightness in the springtime. We are prone to lament that the odours of many of the species are disagreeable; but this is not so without a purpose. Carrion-loving flies which assist in accomplishing cross-fertilization are attracted by this means, and the flapping of their wings makes a sonorous hum through the treetops. Although this tree is common throughout the north, it appears not to be as much found in gardens as formerly. Until late in the autumn the bright red fruit hangs on the branches. The closely grained and hard wood is brown with a reddish tint.

C. macracántha, long-spined thorn, is a similar tree to the preceding one and has longer and brighter brown thorns which grow on its straggling branches. Its leaves are broadly obovate, and its flowers and fruit are rather small. From May until June it may be found in bloom.

BLACK THORN. PEAR THORN. PEAR HAW.

(*Plate LXXXIV.*)

Cratæ̀gus tomentòsa.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Head, flat, broad; branches, thick.*	8-25 *feet.*	*Atlantic seaboard westward to Missouri and Texas.*	*May, June.* *Fruit: October.*

Bark: ashy grey, broken into thin scales. *Young twigs:* bronze-green or dull orange. *Thorns:* stout; one to two inches long. *Stipules:* linear. *Leaves:* simple; alternate; ovate and narrowing into a margined petiole; the apex pointed; sharply and unevenly serrate, or cut to appear like small lobes; thick. Upper surface greyish green, almost smooth and impressed above the ribs; pubescent below when young and remaining so along the ribs. *Flowers:* numerous; white; odour, disagreeable; about one inch across and growing in loose corymbs at the end of the branches. *Fruit:* orange or dull red; oval or pear shaped; about half an inch in diameter; edible.

Although the black thorn has not the advantage of having its

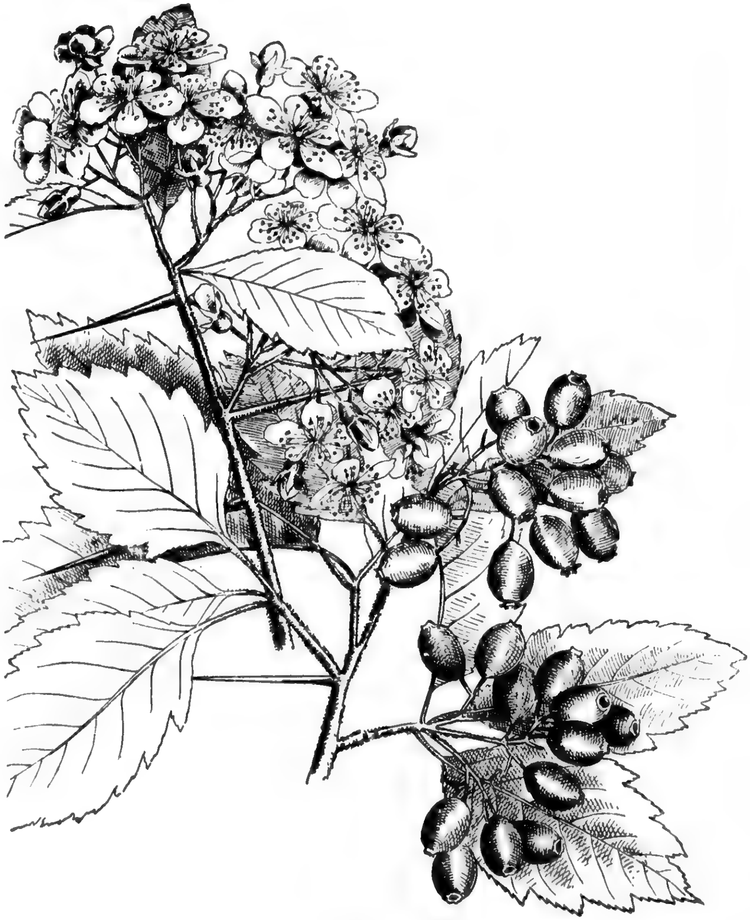


PLATE LXXXIV. BLACK THORN. *Cratægus tomentosa.*

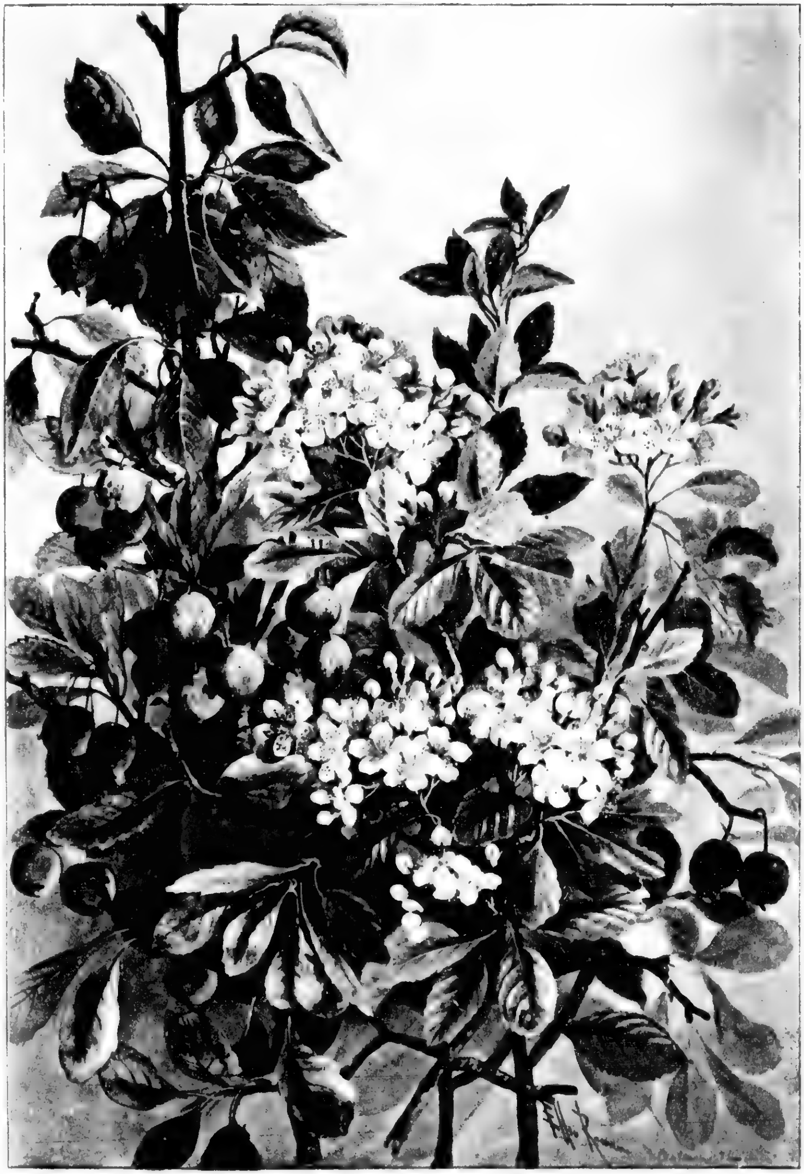


PLATE LXXXV. DOTTED-FRUITED THORN. *Crataegus punctata.*

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blossoms delicately tinted as those of the scarlet thorn, there are several other little points of distinction between them which are in its favour. Its flowers are larger, and its fruit is edible and agreeable to the taste. Perhaps its chief charm, however, is that the bright, cheery appearing fruit remains on the branches all winter, or until the leaf-buds unfold in the spring. Such a feature as this is much thought of when a tree is chosen to be cultivated for ornament. The black thorn has, it must be confessed, a rather changeable nature and varies greatly in the style of its foliage and fruit. Not infrequently it descends to a shrub. This may be nothing more than a clever adaptation to circumstances, as it is more widely distributed through different localities than any other one of the American thorns.

DOTTED-FRUITED THORN. COMMON THORN. LARGE-FRUITED THORN. (*Plate LXXXV.*)

Cratægus punctàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Flat-topped, compact.*	12-30 *feet.*	*New England westward and southward to Ga.*	*May.* *Fruit: Sept.*

Bark: reddish brown; rough. *Thorns:* when present one to two inches long; curved or branched. *Stipules:* lanceolate. *Leaves:* simple; alternate; obovate; obtuse or slightly pointed at the apex, the base tapering and forming on each side a margin to the petiole; sharply and unevenly serrate, or even deeply cut towards the apex, sometimes entire at the base; thick; light green and downy when young, becoming grey-green and dull at maturity and frequently remaining pubescent about the prominent ribs. *Flowers:* white; usually from eight to fifteen growing in a leafy corymb. *Fruit:* one-half to three-quarters of an inch in diameter; yellow and dull red with white dots upon the surface; slightly edible.

A bit of personal history that is usually quoted in connection with this charming little tree is that it was introduced into English gardens by the Duke of Argyll. And for ornamentation hardly one more appropriate could have been chosen. It is of good habit in cultivation, and, when attention is paid to it, it grows very quaintly; its head being broad and flat. As its orange

Cratægus punctàta.

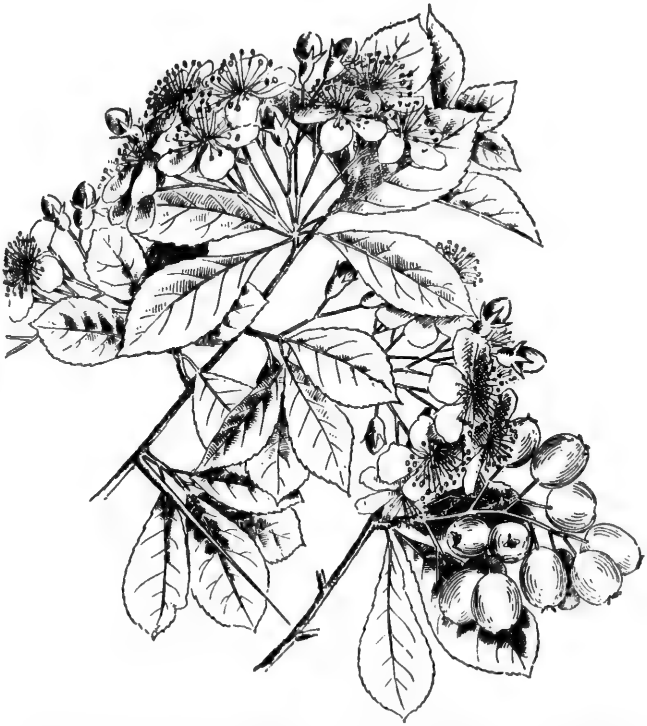


PLATE LXXXVI. COCKSPUR THORN. *Cratægus Crus-Galli.*

and scarlet foliage falls away in the autumn its branches are seen to be covered with showy fruit. That they are dotted with white and the smaller foliage, are marks by which this one of the hawthorns may be known from other members of its family.

COCKSPUR THORN. NEWCASTLE THORN.

(*Plate LXXXVI.*)

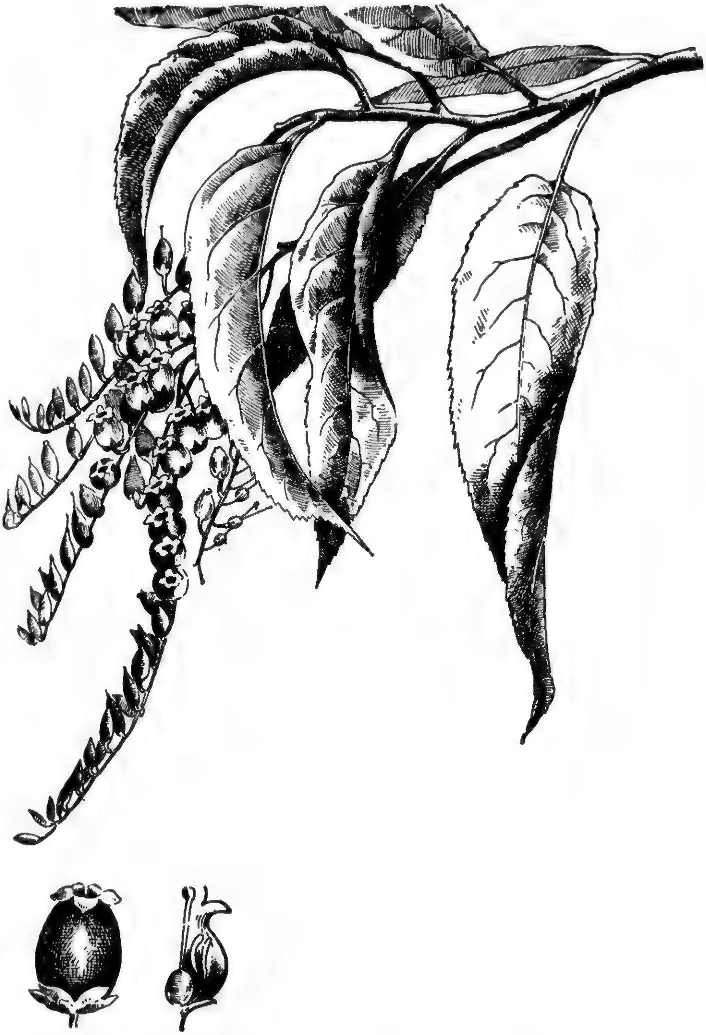
Cratægus Crus-Gálli.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Head, flat, broad: branches, rigid.*	10-30 *feet.*	*Quebec, southward and westward.*	*June.* *Fruit: October.*

Bark: reddish brown or ash colour; scaly. *Thorns:* numerous; two or four inches long; smooth; slender; straight. *Leaves:* simple; alternate; obovate, or lanceolate; slightly pointed or rounded at the apex and tapering into a very short leaf-stalk at the base; very variable in width; unevenly and sharply serrate above the middle; entire below; thick; dark green; lustrous and glabrous above, dull underneath. *Flowers:* numerous; white; fragrant; growing in corymbs from short, lateral branches and appearing after the leaves. *Fruit:* red; dull; globular, or slightly pear-shaped.

Both in Europe and America this small tree is very generally cultivated. It is the favourite of the family for hedge planting, when its compact, thick manner of growth and comparatively low height show to great advantage. An added charm about it is that its bright, firm fruit remains on the branches over the winter. Birds do not devour it; nor do fungal diseases trouble the foliage. The tree has ever a fresh, invigourating aspect. In the autumn the leaves turn to dull orange or scarlet.

Cratægus Crus-Gálli.



Enlarged flower. *Flower laid open.*

PLATE LXXXVII. SOUR-WOOD. *Oxydendrum arboreum.*

SOUR-WOOD. SORREL-TREE. (*Plate LXXXVII.*)

Oxydéndrum arbóreum.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Heath.	*Oblong: branches, spreading.*	15-60 *feet.*	*Penn. to Fla. and westward to Louisiana.*	*June, July.*

Bark: grey tinted with red; deeply furrowed. *Leaves:* five to seven inches long; simple; alternate; slender-petioled; ovate, with pointed apex and pointed or rounded base; finely serrate; lustrous; becoming glabrous at maturity; sour to the taste. *Flowers:* white; scented like honey; growing in long, terminal, one-sided clusters at the end of leafy shoots. *Calyx:* five-toothed. *Corolla:* urn-shaped; five-toothed; pubescent. *Stamens:* ten. *Pistil:* one. *Capsules:* growing in long, drooping clusters; pyramid-shaped; five-valved.

In the same way that Browning has said that all that books can teach us is to do without them; so it matters not so much what we learn about the trees as it does what we see and find out for ourselves. And there is always an individual impression to be received from them by those that have any keenness of sensibility. But unfortunately many take their enjoyment very dolefully and would think it the height of levity to indulge any fanciful ideas the trees might suggest. Again many are not in the habit of watching the trees as they come into bloom, and for them to find the sour-wood hung with its delicate sprays of flowers so suggestive of the lily-of-the-valley must indeed be a revelation. To be able then to inhale to the fullest its beauty and its honey-like scent is a good gift of Providence.

The wood of the tree is hard and closely grained and is of service in many ways. One extensive use to which it is put is the making of handles for tools.

WITCH-HAZEL. (*Plate LXXXVIII.*)

Hamamèlis Virginiàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Witch-hazel.	*Head, open, broad: branches, spreading.*	8-30 *feet.*	*Nova Scotia southward to Florida and Texas.*	*Aug.-Dec.* *Fruit: spring.*

Bark: brown; smooth; falling in thin scales. *Inner bark:* purplish red. S[illegible] lanceolate. *Leaves:* simple; alternate; with short, stout petioles; obovate; pointed or rounded at the apex, unequal at the base; coarsely and irregularly serrate; frequently entire below the middle. Dull green above, lighter coloured and pubescent underneath; slightly astringent. *Flowers:* bright yellow; growing in axillary clusters on short peduncles. *Calyx:* four-parted, with bractlets underneath; inner surface orange-brown; pubescent. *Corolla:* bright yellow; of four almost linear petals, often twisted and falling with the stamens. *Fruit:* a woody capsule, with orange-brown, pubescent seeds.

This dainty shrub is one of the unconventional spirits of the woodlands and pays the penalty for its vagaries by having attached to it the reputation of witchcraft. It is very slow about ripening its fruit. Throughout the autumn and winter the calyx-lobes protect the ovary which does not begin to enlarge until the following spring. The fruit of one year, therefore, attains maturity at the same time that the flowers of the next year are opening. When the pods burst open they cast forth their seeds with astonishing force and to a great distance from the plant. To the North American Indian we undoubtedly owe the first knowledge of the efficacy of its bark for the curing of inflammations. It has for a long time been distilled in alcohol to make Pond's extract A strange thing about it is, however, that chemists have failed to discover in it any "active medicinal properties."

Green hazel wands were for a long time used by the credulous to locate, through their supposed power of witchcraft, the presence under ground of gold or of springs of water. A forked branch was twisted between the fingers and thumbs of both hands, and the direction in which it pointed was taken as an indication of where the desired metal or water should be sought. The popular name of the plant is an outcome of this practice. Although we are accustomed to seeing Hamamelis Virginiana as a shrub, it becomes arborescent on the high slopes of the Alleghany mountains in North and South Carolina and in Tennessee. Its wood is reddish brown quite hard and closely grained.

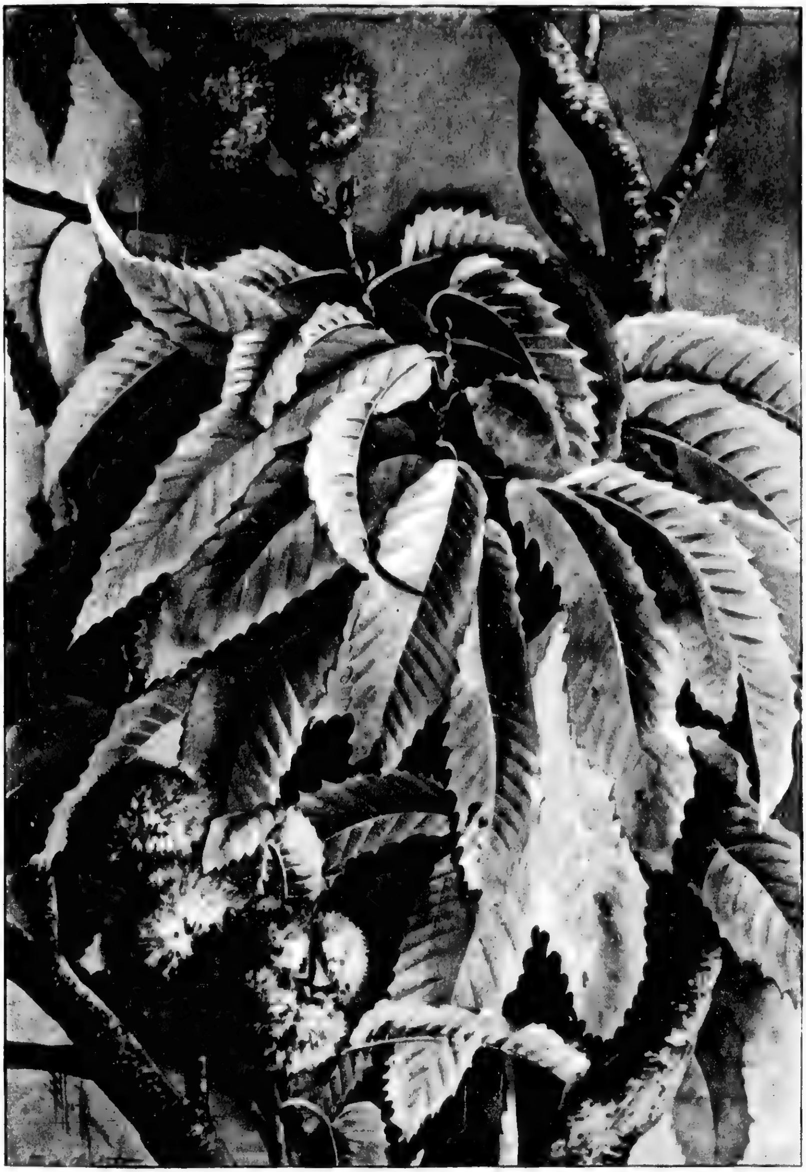


PLATE LXXXIX. AMERICAN CHESTNUT. *Castanea dentata.*

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AMERICAN CHESTNUT. (*Plate LXXXIX.*)

Castànea dentàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Round-topped: branches, spreading.*	50-80 *feet or higher.*	*Southern Maine to Fla. and Tenn.*	*June, July, Sept., Oct.*

Bark: granite-grey; ridged, but smooth in young trees. *Leaves:* simple; alternate; with short petioles; oblong-lanceolate; pointed at both ends or rounded at the base; feather-veined; coarsely serrate; the ribs terminating in the sharp, bristle-pointed teeth of the edge. *Sinuses:* rounded. Dark green above, lighter coloured below; glabrous. *Sterile flowers:* yellow; sweet-scented; growing in slender, axillary catkins; fertile ones, about three or four in each involucre. *Fruit:* growing in a green, prickly husk, which opens in four sections and discloses three or four ovoid nuts, flattened on one or both sides; brown, and tipped with a white remnant of the style. Seldom more than three fully developed; edible; sweet.

"Under a spreading chestnut tree
The village smithy stands;
The smith, a mighty man is he,
With large and sinewy hands;
And the muscles of his brawny arms
Are strong as iron bands."

Fortunate, indeed, was the good smith immortalized by Longfellow to be able to cool himself from his labours at the forge under the voluminous, kindly shade of the chestnut tree. It has, perhaps, the heart of a humanitarian. Country urchins surely forget the need of money when they find, after a light frost, the ground covered with its inviting nuts, and many a begrimmed Italian is consoled by them for the fortune he expected to find in the new world. Early and late in the autumn we see these men standing on the streets of the cities making with their time-worn knives a cross upon the nuts, and then roasting them in their little machines. Although they are smaller than the nuts of the European varieties, their meat has a sweeter flavour and a finer grain. Owing to their small size, however, the labour of preparing these native chestnuts for cooking is considerable, and this is perhaps the reason that chestnut purée and pudding are not so frequent in this country as they are in Europe.

The tree at all times is an imposing and beautiful object.

It seems as though every one should know its tall, column-like shaft, its dense, characteristic foliage, and its quaint fruit. It grows very rapidly. Although durable when in contact with the soil, its reddish-brown wood is not strong, and warps badly when it is dried.

C. Pumila, Chinquapin, (*Plate XC.*) is a shrub or small round-topped tree which grows on rich hillsides, in swamp borders or even in dry soil, from New Jersey southward and westward. Its leaves are oblong, feather-veined and conspicuously serrate. On the under surface they have a dense, white fuzz. In the burr there is but one ovoid nut, or, very rarely, two. The meat is very sweet, and they are sold in large numbers in the streets and markets of the southern and western cities. To this fruit ancient writers have referred as being "a great daintie."

AMERICAN BEECH. (*Plate XCI.*)

Fàgus Americàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Round-topped: branches, horizontal.*	50-70-120 *feet.*	*Nova Scotia to Fla. and westward.*	*April, May, Sept., Oct.*

Bark: light bluish grey; smooth. *Leaves:* simple; alternate; with very short petioles; ovate; oblong; with pointed apex and rounded or narrowed base. *Ribs:* straight, unbranched and terminating in the remote teeth. Fringed on the margins with soft, white hairs which soon fall; glabrous. *Staminate flowers:* clustered on drooping peduncles. *Pistillate ones:* two only and terminating a scaly bracted peduncle. *Fruit:* a pair of three-sided nuts, with a sweet and edible kernel which grows within a four-celled, prickly burr splittng when ripe midway to the base.

It is fortunate that there is no one type of tree which may alone be regarded as beautiful. Beauty is truly, as has been so justly and often said, in the eye of the beholder. By many the American beech is thought to be the most lovely of all trees. Its train of admirers are quite as ardent about it as those of the American elm, the sugar maple, the gum tree, and many others. Certainly in the spring when it is covered with its staminate blossoms it is a splendid sight, and its perfect leaves are seldom spotted or eaten by insects. In the winter, also, it is par-

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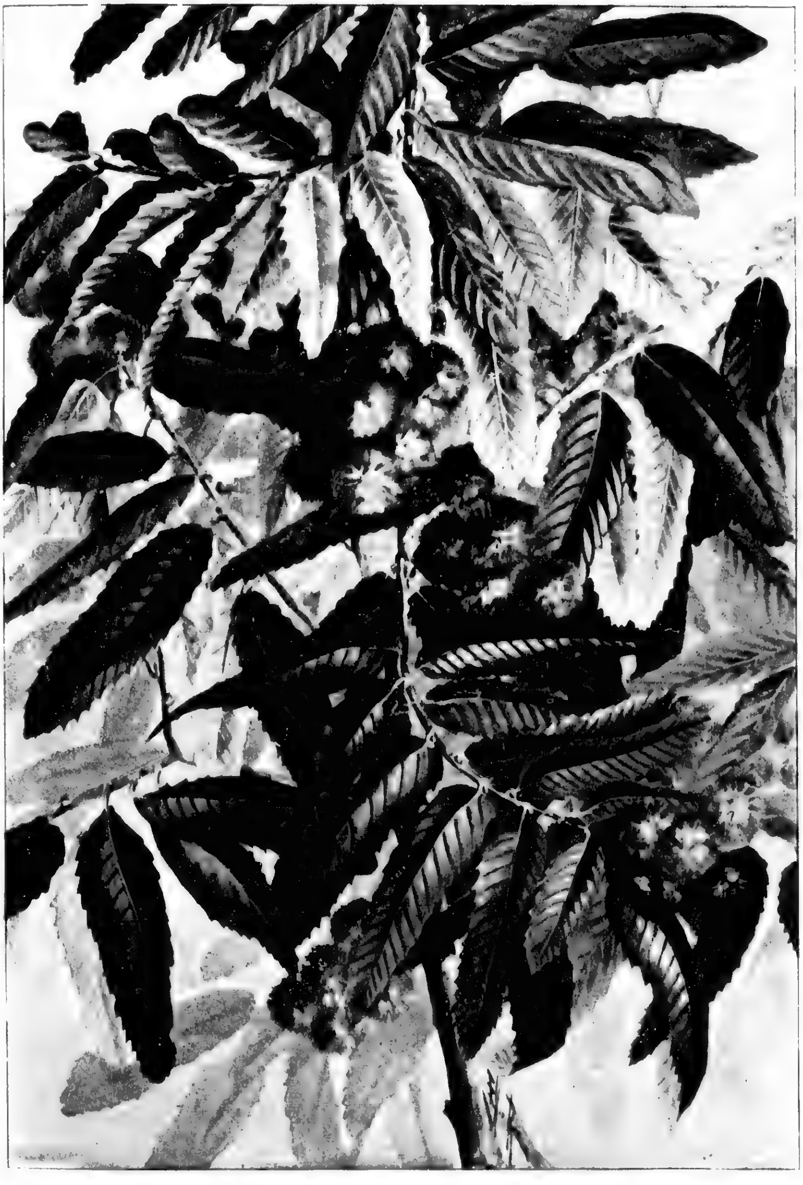

PLATE XC. CHINQUAPIN. *Castanea pumila.*

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ticularly interesting. Its beautiful bark then appears very bright, and after its fine leaves have fallen, although many of them, pale and dried, cling to the branches throughout the winter, the structure of its massive head is seen to advantage. Of all the trees of America it is one of the most widely distributed. In the Canadian markets and those of many of the middle and western states, its nuts are sold in considerable quantities. Although the reddish and closely-grained wood of the tree checks badly in drying and is difficult to season, it is still a valuable article of commerce. Shoe lasts are made from it, and pulleys and handles of tools; chairs and milking stools also are often made of beech wood.

F. sylvàtica, the European beech, is planted in this country, and was for a long time confused by early travellers with the American species. It may be known by its broader leaves with their strongly crenate edge and with the abundance of fine hairs on their under surface. Often not until November do these leaves begin to show their golden colour and gradually to turn to russet-brown. On the ground as they fall they make a fresh, thick bed. The American beech is then completely stripped of its foliage.

F. sylvàtica foliis atrorubentibus, the beautiful copper beech, with its shimmering masses of richly hued foliage, is a variety of the preceding species. Although the little chlorophyll grains which contain the green colouring matter of the foliage are present and no doubt working away quite busily in these leaves; there is probably some strong pigment in the leaf-sap which overpowers them and thus gives its own deep, rich colouring to the foliage.

CANOE BIRCH. PAPER BIRCH. WHITE BIRCH.

(*Plate XCII.*)

Bétula papyrífera.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Pyramidal; branches, pendulous.*	40-70 *feet or higher.*	*Northern Penn. northward.*	*April, May.*

Bark of trunk: chalky white; smooth and disagreeable to the touch; tough; durable, and readily peeling from the wood; in its turn it separates into many thin papery sheets, which are faint red in colour and marked with short, dark lines. *Leaves:* simple; alternate; with downy petioles; ovate; with pointed apex and rounded, wedge-shaped, or sub-cordate base; doubly and unequally serrate; dark green and smooth above; dull below and pubescent in the angles of the straight ribs. *Flowers:* monœcious; growing in slender, cylindrical and scaly catkins. *Strobiles:* growing on slender stalks; the wings of the minute nuts broad and often fringed.

Happily the canoe birch wears a uniform that we all know; and when many of the trees are seen from afar, amid the dark shades of the forest, they appear not unlike the advancing guard of a regiment. There is about them the same air of distinction from all that surrounds them. The tree seems to belong especially to the primitive people of the north, who must surely regard it with affection. The Indian's birch-bark canoe carries him swiftly and silently over the water as he perchance guides it by a paddle made from the wood of the tree. When the streams are frozen and the covering of the earth is as white as the birch's bark, he is drawn on sledges or glides along on snow shoes that are alike constructed in part from the tree. From rough weather his wigwam is also protected by its resinous bark, and when the sweet sap begins to flow in the springtime he knows how to boil it into a syrup or make it into a cooling drink. Of his life the tree is a part, and from the standpoint of sentiment it seems as though it should be left to the Indian rather than given over to lumbermen who sell it for the making of shoe lasts, pegs and fuel. Tourists inflict great damage to the appearance of the tree by tearing off its bark, as its peculiarity of peeling horizontally is well known. In the mountainous regions of the north it is frequent on wooded slopes or often by the borders of streams.

That Hiawatha's request comes so spontaneously to the mind in connection with the tree seems to accentuate the Indians' vital love and knowledge of it.

"Give me of your bark, O Birch-Tree!
Of your yellow bark, O Birch-Tree,
Growing by the rushing river,
Tall and stately in the valley!

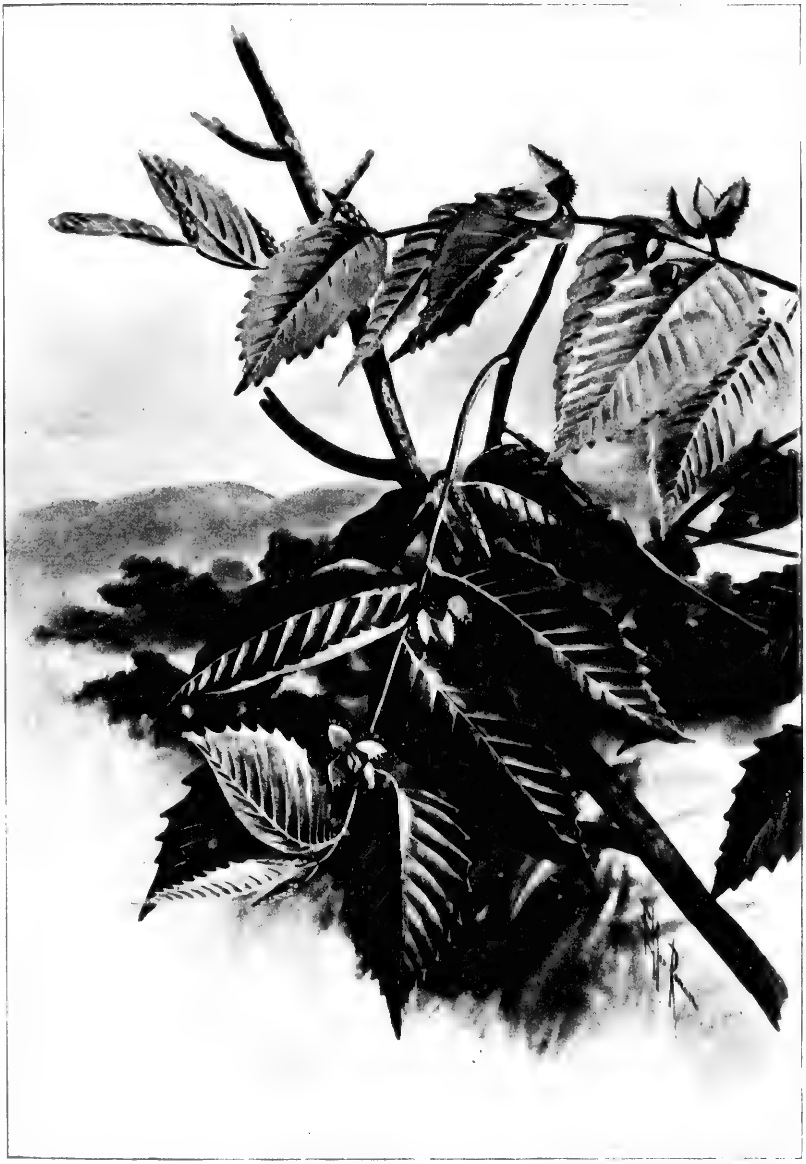

PLATE XCI. AMERICAN BEECH. *Fagus Americana.*

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I a light canoe will build me,
Build a swift Cheemaun for sailing,
That shall float upon the river,
Like a yellow leaf in Autumn,
Like a yellow water-lily !
  " Lay aside your cloak, O Birch-Tree !
Lay aside your white skin wrapper,
For the summer-time is coming,
And the sun is warm in heaven,
And you need no white-skin wrapper !

And the tree with all its branches
Rustled in the breeze of morning,
Saying with a sigh of patience,
  " Take my cloak, O Hiawatha ! "

SWEET BIRCH. BLACK BIRCH. CHERRY BIRCH.

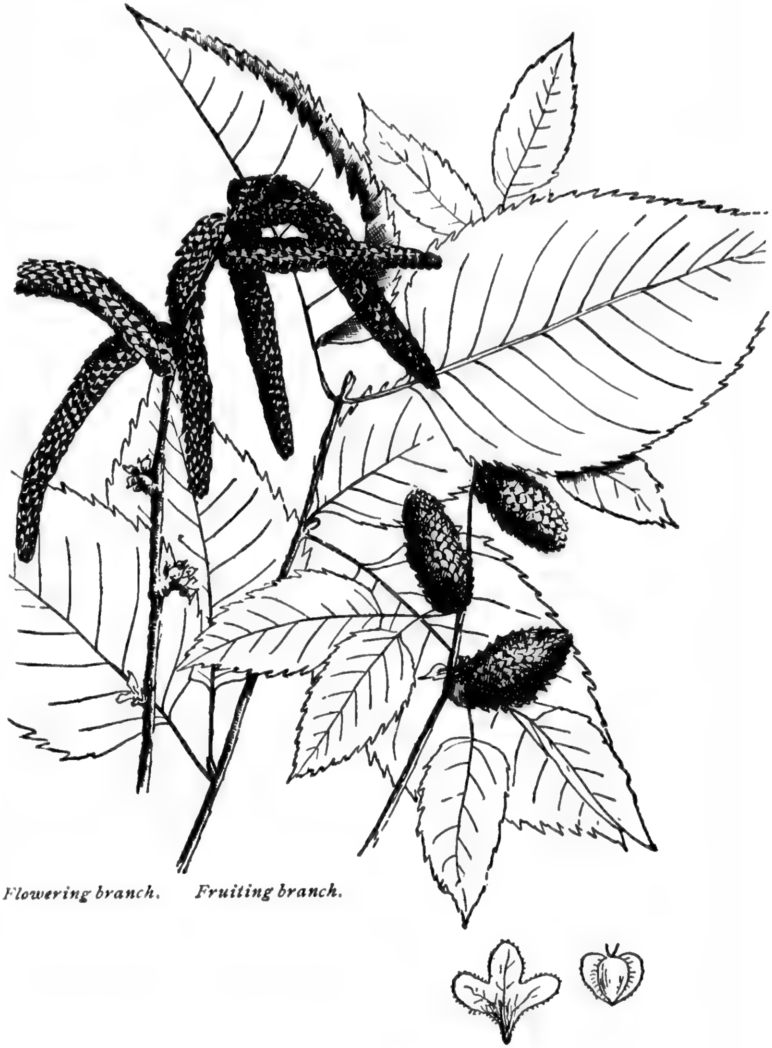
(*Plate XCIII.*)

Bétula lénta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Rounded; branches, slender.*	30 80 *feet.*	*New Foundland to Ontario southward and westward.*	*April, May.*

Bark : dark; rich brown ; smooth but becoming rough as the tree grows old; not subject to peeling. *Branches:* reddish; smooth ; and covered with white wart-like dots; sweet; aromatic. *Leaves :* simple; alternate ; with short, downy petioles; ovate, with pointed apex and rounded or cordate base ; finely and doubly serrate ; ribs, straight; vivid, green and glossy above ; dull and pubescent below but becoming smooth. *Flowers :* growing in catkins and appearing before the leaves. *Staminate ones:* golden ; long. *Pistillate ones* : in dense, shorter catkins. *Strobiles:* dark green ; sessile ; with rounded and lobed scales. *Nut :* obovate.

When we go among the trees and perhaps rest for awhile under the shade of the sweet birch, we might, if our ears were sufficiently quickened, hear many tales of country-lore that are passing through the swish of its leaves. Tales are astir about the evil spirits that seek it and greedily devour its sweet bark. To their hearts gratitude is unknown. The tree could tell also of many that love the shimmer of its leaves ; that notice the golden pollen in its beautiful spray of staminate blossoms and partake of its shade as graciously as though they were accepting a gift from a friend. The subtle instinct of the urchin, for surely he never learned from botany how good to the taste were its twigs, leads



Flowering branch. *Fruiting branch.*

Scale of fruit. *Nutlet.*

PLATE XCIII. SWEET BIRCH. *Betula lenta.*

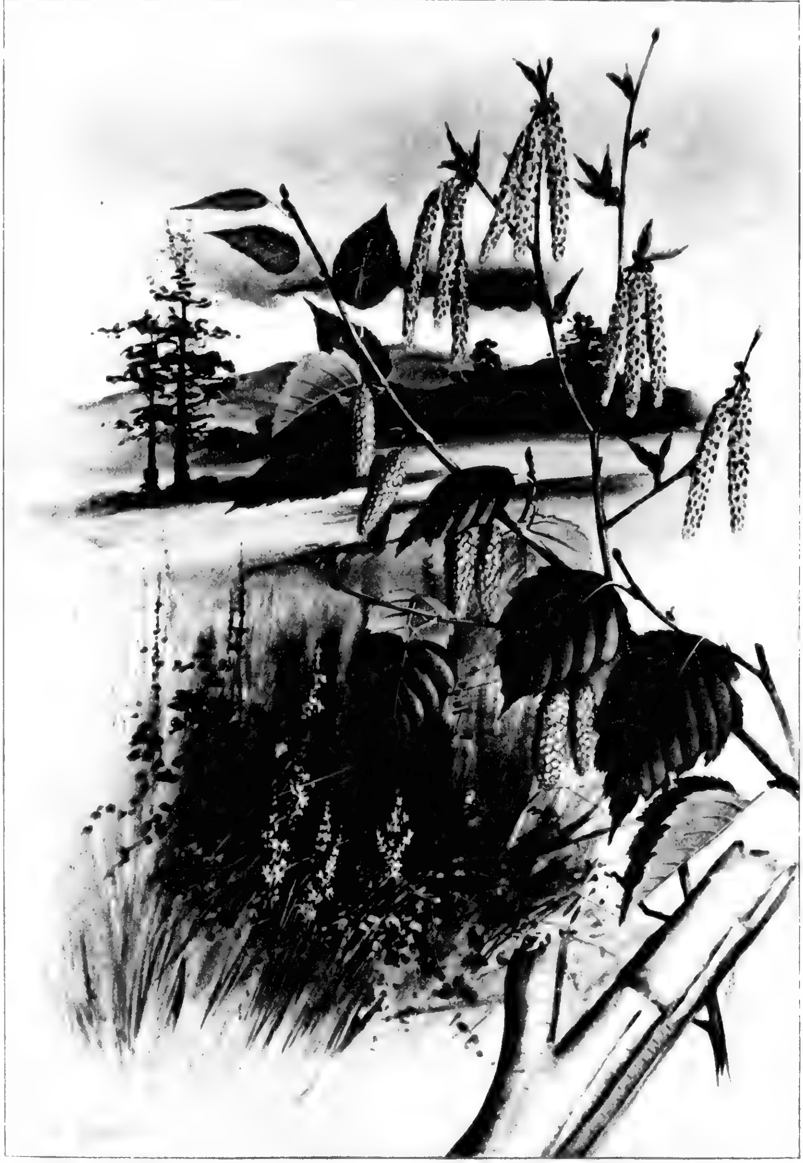


PLATE XCII. CANOE BIRCH. *Betula papyrifera.*

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him to spend many an hour under its shade. He chats to his companion about his struggles with the trout or of the mischief the squirrels have done to the leaf-buds, and he prides himself upon locating a borer as surely as he can scent the advance of spring. The sweet birch knows too the stride of the axe-man; for its fine, dark reddish wood is valuable. It receives a beautiful polish and is strong and heavy. As a substitute for black cherry it is made into furniture. In fact the appearance of the tree is such that it might readily be mistaken for a cherry tree. Birch oil which is an important article of commerce is distilled from the foliage and graceful branches of the tree. It is the same as the oil of wintergreen which is taken from the quaint little plant, *Gaultheria procumbens.*

YELLOW BIRCH. GREY BIRCH. (*Plate XCIV.*)

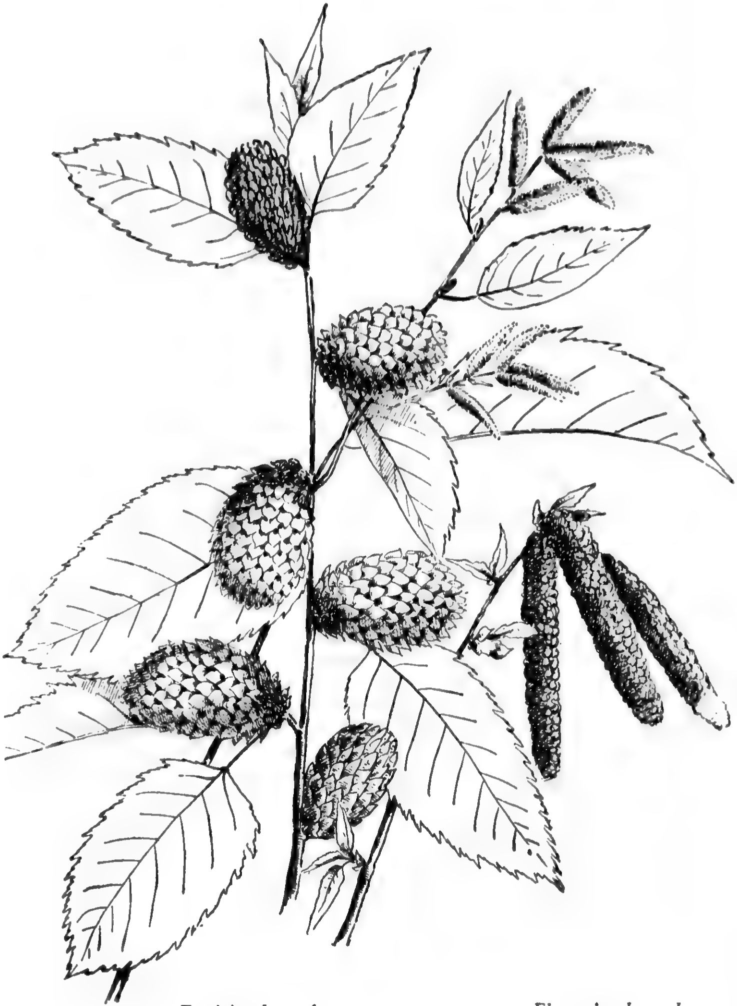
Bètula lùtea.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Pyramidal; branches, long, slender.*	40 90 *feet.*	*New England southward to Tenn.*	*April, May.*

Bark: light yellowish grey; marked horizontally and separating and peeling like shavings. Both the bark and the greyish-brown twigs have a slightly aromatic sweet taste. *Leaves:* simple; alternate; with slender downy, petioles, often in pairs; ovate, with pointed apex and narrowed and rounded or rarely sub-cordate base, coarsely and unequally serrate; ribs, straight and conspicuous. Dull green above, downy below and becoming smooth at maturity. *Staminate catkins:* yellowish green; three to four inches long. *Pistillate catkins:* short; sessile. *Nuts:* oval; broad; wider than the wings.

It is frequently said by many that they never notice the bark of a tree or its leaves; that it appeals to them entirely by its general outline and presence. Again others observe these things almost to the exclusion of the individual character of the tree. The bark of the yellow birch, however, is one that should attract the attention of all; for it is particularly unique and beautiful. It is golden with a silver sheen and the separating shreds curl about it like the ribbon decorations of some fantastic lady. An air of delicacy also makes the tree quite distinctive from those among which it grows.

In Canada and New England this birch is one of the largest



Fruiting branch. *Flowering branch.*

PLATE XCIV. YELLOW BIRCH. *Betula lutea.*

trees that are not evergreen, and there, as in New York state, it is valued for its excellent timber. The light reddish-brown wood has a fine, satin-like surface and is considerably made into furniture, boxes and many small articles. It is also used for fuel. As the tree occurs southward it is small, or it becomes a shrub. A large amount of moisture is required by it that it may thrive well.

HAZEL-NUT. FILBERT. (*Plate XCV.*)

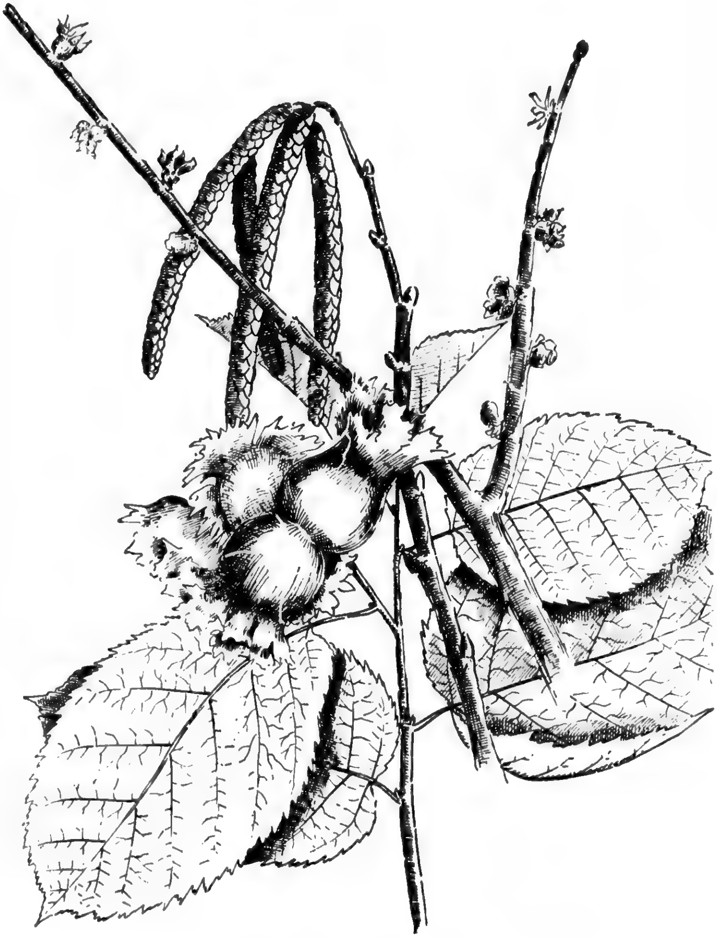
Córylus Americána.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Broad, spreading.*	4-8 *feet.*	*Maine westward and to Fla. and Texas.*	*March, April.* *July, August.*

Branches : greyish or pinkish brown. *Twigs :* pubescent, with pinkish hairs. *Leaves* : simple ; alternate ; with hairy petioles ; ovate or almost rounded, with pointed apex and slightly cordate or blunt at the base; irregularly and doubly serrate ; dark green and almost glabrous above, paler and pubescent beneath. *Staminate catkins:* long ; solitary. *Fruit :* growing in the base of an involucre which is composed of two broad, leaf-like bracts, extending far above the nut and deeply cut at the top ; green ; pubescent. *Nut :* golden brown ; almost round ; shell, hard. *Kernel:* edible ; sweet.

Nutting days are truly among the best of all the year, and who that has been brought up in the country cannot recall some dense thicket or low stone wall by which these bushes grew. The filberts, as the nuts are often called, yield up readily their treasures. One sharp blow on the smooth shell will sever it in two, and the round, solid meat then rolls innocently out. It has only to be picked up and eaten.

One of the first signs that the season is advancing is to find the hazel catkins hanging loosely and with their stigmas well out. They then soon shed abundantly their pollen. Even during the winter the staminate flower-buds shine brightly on the bushes; but the demure pistillate ones lie hidden under their scaly buds. They cling mostly, however, to the summit of the branches where the golden dust can find them and the long rays of sunshine linger upon them lovingly.



Buds, catkins and fruit.

PLATE XCV. HAZEL-NUT. *Corylus Americana.*

BEAKED HAZEL-NUT. (*Plate XCVI.*)

Córylus rostràta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Erect, stiff.*	4-8 *feet.*	*Nova Scotia southward and westward.*	*April, May.* *Fruit: Aug., Sept.*

Branches: light brown; glabrous or often pubescent; slender. *Twigs:* nearly glabrous. *Leaves:* simple; alternate; with slender petioles; ovate, or ovate-oblong; pointed at the apex and slightly cordate or blunt at the base; doubly serrate; bright green above; glabrous; paler underneath and nearly glabrous; thin. *Staminate flowers:* growing in catkins; the single flowers under each bract with four stamens divided so as to produce eight anthers. *Pistillate flowers:* growing in dense spikes and having two flowers under each scale. *Fruit:* growing in the base of an involucre which is prolonged into a curved tube, cut at the summit and covered with bristly yellow hairs. *Nut:* brown; ovoid or ovate. *Kernel:* edible; sweet.

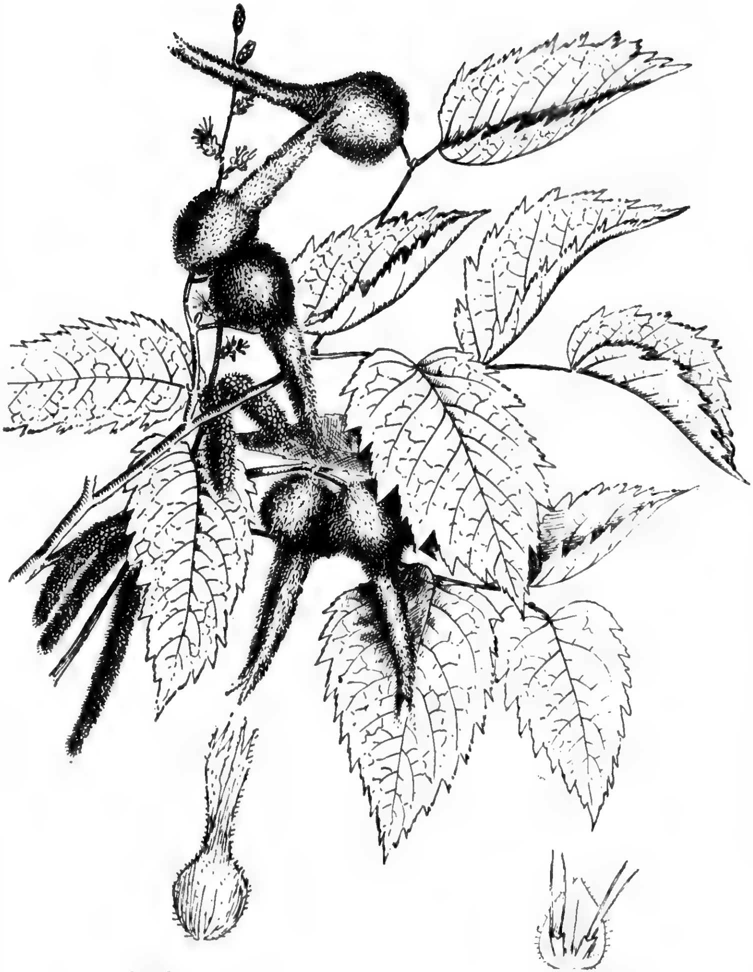
Especially when in fruit is this species of hazel-nut readily distinguished from the common one; for although they both have strangely fashioned involucres that of Corylus rostrata extends into a long, curious beak, and is moreover covered with reddish tipped bristles which, when the nuts are being gathered, penetrate the skin as readily as spun glass. This involucre is indeed a most interesting contrivance. Its future existence, as can be seen under a microscope, is foretold by a tiny ring about the young ovary. Small as it is, it has a strong determination to grow and develops to some extent even when one or neither of the pistillate flowers has been fertilized and therefore does not proceed to grow. This seems to be mere presumption on its part; as its field of usefulness does then not exist, and it but raises false hopes in the hearts of those seeking the nuts. How much more are those appreciated that practice no deception, but at maturity split open as though proudly to show the fruit they have guarded.

LARGE-TOOTHED ASPEN. POPLAR. (*Plate XCVII.*)

Pópulus grandidentàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Head, narrow; branches, crooked and spreading.*	40-80 *feet.*	*Nova Scotia southward to North Carolina and Tenn.*	*March, April.*

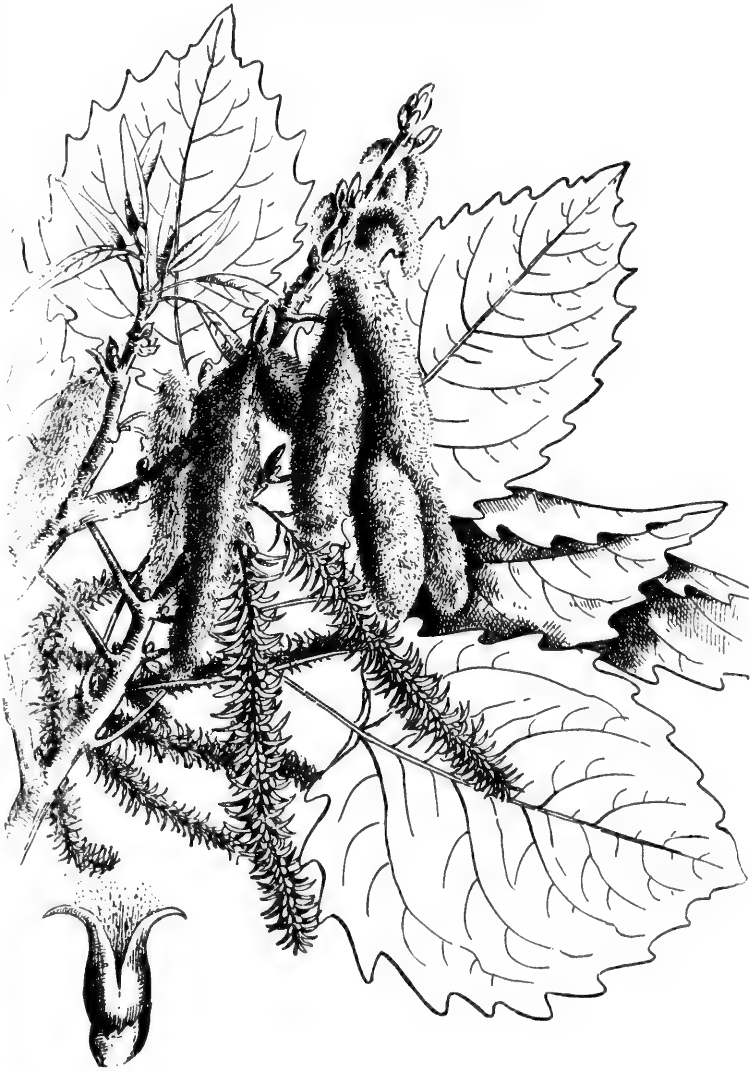
Bark: dark, reddish brown; irregularly furrowed; when young, greenish grey. *Leaves:* simple; alternate; broadly ovate; with short-pointed apex and



Involucre of nut.

Pistillate flower.

PLATE XCVI. BEAKED HAZEL-NUT. *Corylus rostrata.*



Staminate and pistillate branches.

Enlarged fruit.

PLATE XCVII. LARGE-TOOTHED ASPEN. *Populus grandidentata.*

rounded or squared at the base; coarsely and irregularly dentate, the sinuses rounded; ribs, distinct; dark green above; paler below and covered when young with a silky wool; glabrous at maturity; the petiole flattened. *Flowers:* diœcious; growing in long, often curving catkins; the scales of the staminate ones from five to six-cleft, sparingly fringed. The staminate trees bloom earlier than the pistillate ones.

As the specific name of this tree implies, its characteristic feature is the large, coarse teeth of its leaf margins. And the link of kinship between it and the delicate *Populus tremuloides* is discernible even through the ruggedness of its foliage. As the young leaves of the poplars unfold they have all a silvery sheen that in the case of the willows is golden. Their innumerable seeds also, when they begin to unloosen themselves from their long clusters and fly about, tint the tree and fill the air with a silvery whiteness. In the autumn the leaves of this species turn to such a clear, bright yellow that a luminous glow is radiated by the tree to a considerable distance. We may seek to find it in the deep, rich soil of woods or approaching the borders of swamps.

The wood of Populus grandidentata is soft and not generally regarded as being of much value. It is made into wood-pulp and later into paper.

TULIP TREE. WHITE-WOOD. (*Plate XCVIII.*)

Liriodéndron Tulipífera.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Magnolia.	*Tall, rounded; branches, spreading.*	60-190 *feet.*	*Vermont and Rhode Island to Florida and westward.*	*May.* *Fruit: Sept., Oct.*

Bark: reddish brown or grey; furrowed. *Branches:* curved and marked with narrow rings; aromatic. *Leaves:* simple; alternate; long petioled; very broadly ovate or nearly orbicular; broadly notched at the apex, rounded or cordate at the base and having four or more lobes, the sinuses between them rounded. Dark green and shiny above, paler below. *Flowers:* two inches high; cup-shaped; erect and growing on stout peduncles. *Petals:* obovate; greenish yellow; orange coloured within. *Sepals:* reflexd. *Stamens:* numerous and growing in ranks upon the receptacle. *Pistils:* growing in a column-like body upon the receptacle. *Fruit:* about three inches long, a cone of dry, oblong and acute carpels.

There is something to make one tremble in the gigantic proportions, the tall, column-like trunk and the strangely cut

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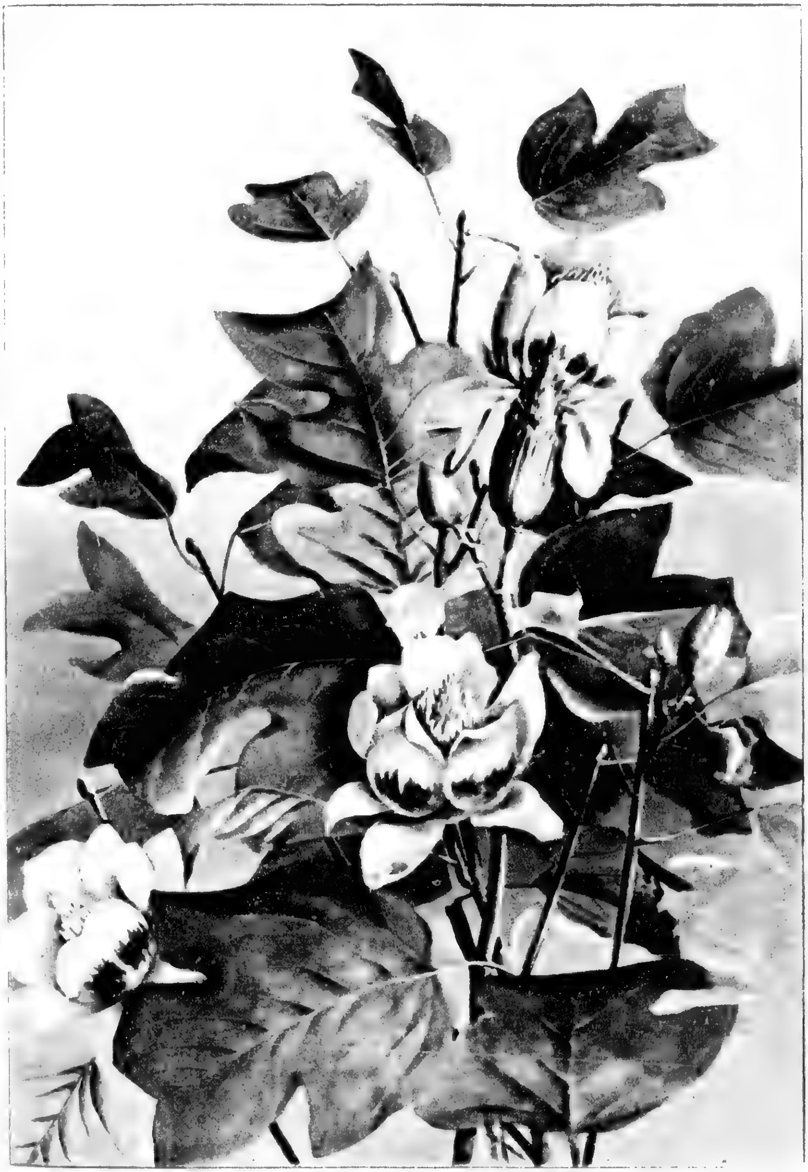

PLATE XCVIII TULIP TREE. *Liriodendron Tulipifera.*

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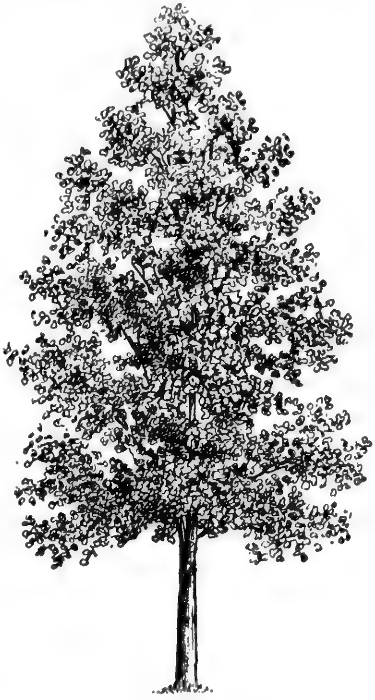
leaves of this tree when it is approached for the first time, and the fancy is bred that the world would be a very different place if trees should ever lose their meek defenselessness and strut about arranging things to suit themselves. Man would appear very small then, while the tulip tree might be the king of the globe. It is a tree that at all times is readily recognised; but in the spring, when it is covered with its tulip-like flowers, it is truly a surprising sight. As freely and unconsciously the great structure throws out its bloom as though it were some lively, wayside flower. From the coloured illustration the imagination can picture the effect so great a number of the flowers would produce. In cultivation the tree is a great favourite and has, especially when young, a high-bred expression. It is hardy, grows rapidly and becomes without doubt one of the largest and most beautiful of the American forest. Often when growing in the "open" it is clothed to the ground. As a timber tree it is valuable, and is well adapted for making the curved panels in carriages. By the aborigines it was used for the frames of their canoes. In many parts of the South the name yellow poplar clings to the tree. It originated because the leaves have long petioles that aid them to tremble in the wind. It is however not a desirable one and should be rejected.



Liriodéndron Tulipífera.

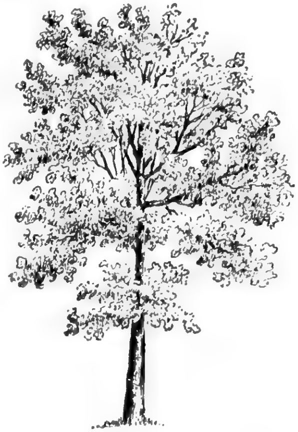
At Craggy Mountain, twelve miles north-east of Asheville, North Carolina, there is standing a tulip tree that is thought to be the largest one in America. In girth it is thirty-one feet at a distance of ten feet from the ground, and it stands upwards of one hundred and fifty feet high. In that rugged place, at an elevation of three thousand feet above the sea level, it raises a clear and straight shaft which is also hollow. What is the tree's history, no one knows.

WHITE OAK. (*Plate XCIX.*)

Quércus álba.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Head, broad; branches, spreading.*	60-80 *feet or higher.*	*Maine to Ontario and southward and westward.*	*May, June. Fruit: Sept., Oct.*

Bark: light grey or nearly white; less rough than that of most oaks; often scaly in old trees and breaking off in thin sheets. *Leaves:* simple; alternate; obovate; pinnately-lobed, wedge-shaped at the base and with from three to nine lobes; broad and rounded, with coarsely notched or entire edges. *Sinuses:* narrow; rounded. Bright green above, paler below; at maturity glabrous; variable. *Acorns:* axillary; growing in pairs on short peduncles, or sessile. *Cup:* saucer-shaped; shallow; rough, with appressed scales. *Nut:* green, turning to chestnut-brown; lustrous; oblong, from three-quarters to an inch long; edible; sweet.



Quércus álba.

The ancients made oak trees objects of love and reverence, and they also attributed to them the mystic power to foretell or advise about coming events. The oldest oracle of the Greeks was that of Jupiter at Dodona in Epirus. It was believed that two black doves simultaneously flew from Thebes in Egypt. One alighted in an oak grove at Dodona and in a human voice proclaimed that an oracle of Jupiter should there be established by the people. The other dove carried a similar message to the temple of Jupiter Ammon in the Lybian oasis. Accordingly, the oracles were set up, and

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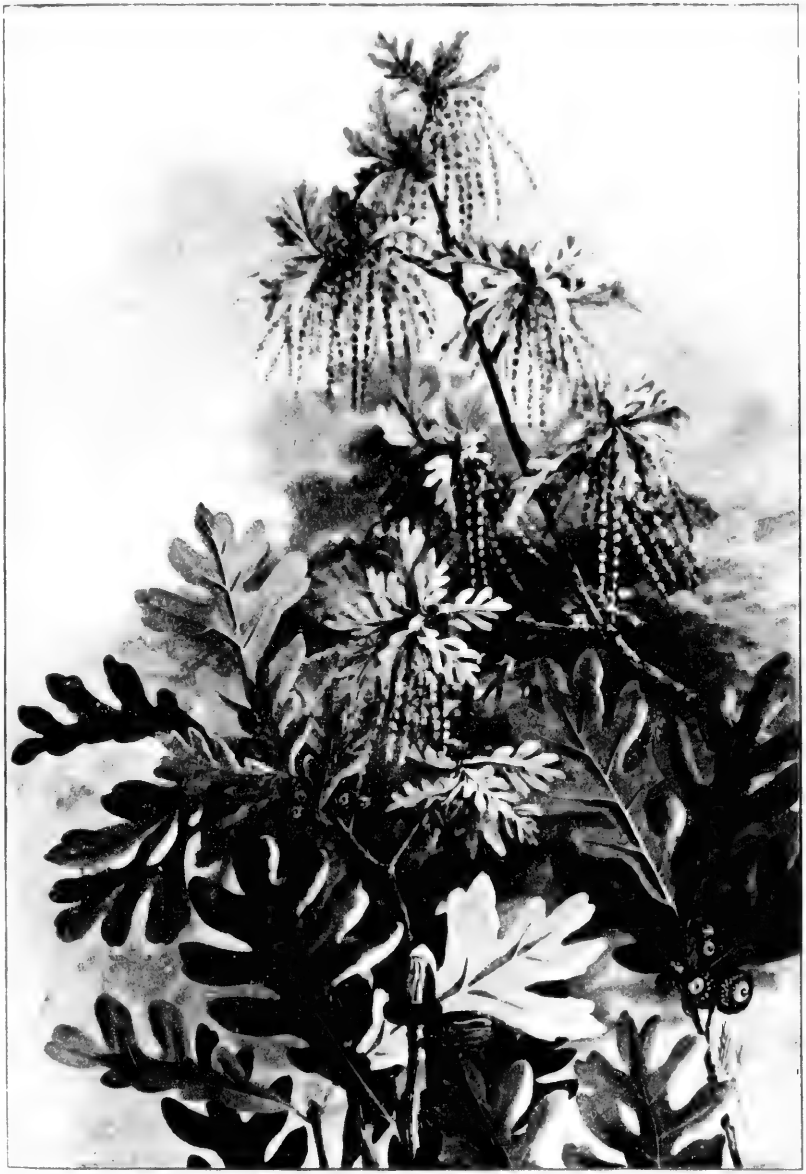

PLATE XCIX. WHITE OAK. *Quercus alba.*

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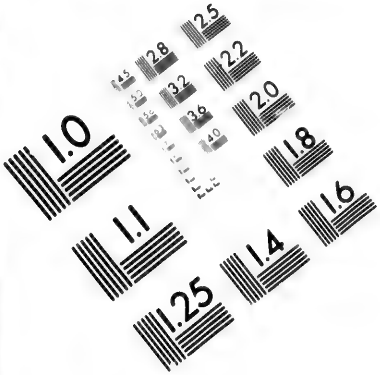
the priests in the temples interpreted the responses that were conveyed to them by the motion of the trees in the wind. The lover in Tennyson's English Idyll, "The Talking Oak," exclaims in gratitude for the knowledge it has told him of his sweetheart Olivia and in reference to the ancient oracle :—

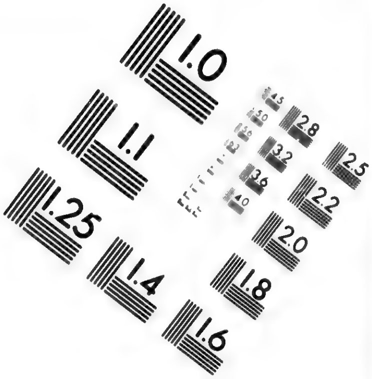
> "And I will work in prose and rhyme,
>   And praise thee more in both
> Than bard has honour'd beech or lime,
>   Or that Thessalian growth,
> In which the swarthy ring dove sat,
>   And mystic sentence spoke;
> And more than England honours that,
>   Thy famous brother oak,
> Wherein the younger Charles abode
>   Till all the paths were dim,
> And far below the Roundhead rode,
>   And humm'd a surly hymn."

Hercules we must also remember carried an oaken club.

Of the genus, Quercus alba is one of the most stately. It seems odd, in earliest spring to see the great, grey thing putting forth leaves as tender tinted and pink as many a shy, woodland flower. In their second childhood,—that is, in the late autumn,—the leaves again become a ruddy hue, deep and vinous; and after withering, drop from the trees at the beginning of winter. Throughout their course of existence they are very variable on different trees, and often two or three distinct forms are presented.

The white oak is one of the very valuable timber trees of North America and is imported as staves in large quantities to Europe. In ship-building and in the manufacturing of carriages it has an important place.





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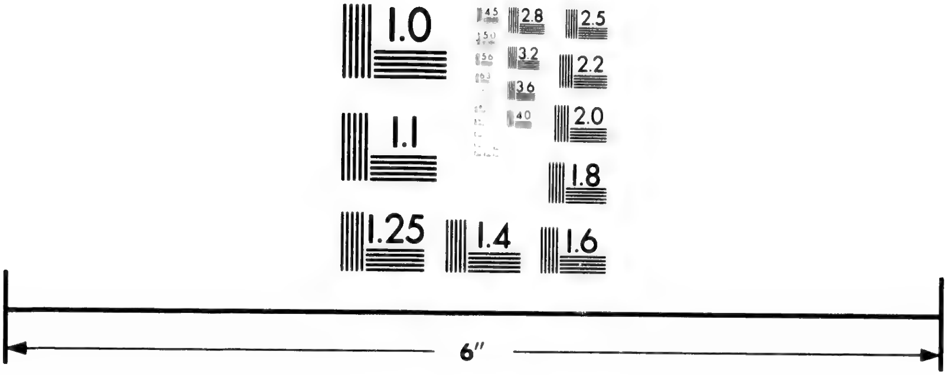

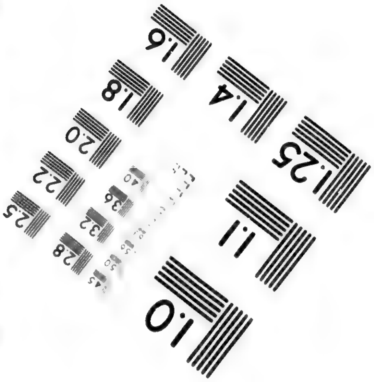

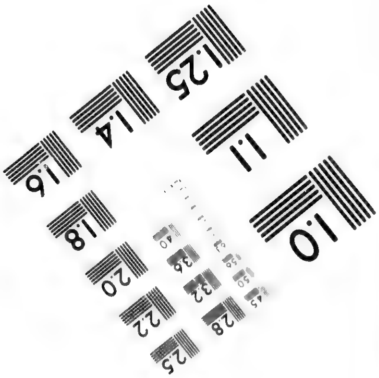

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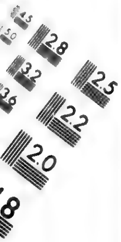
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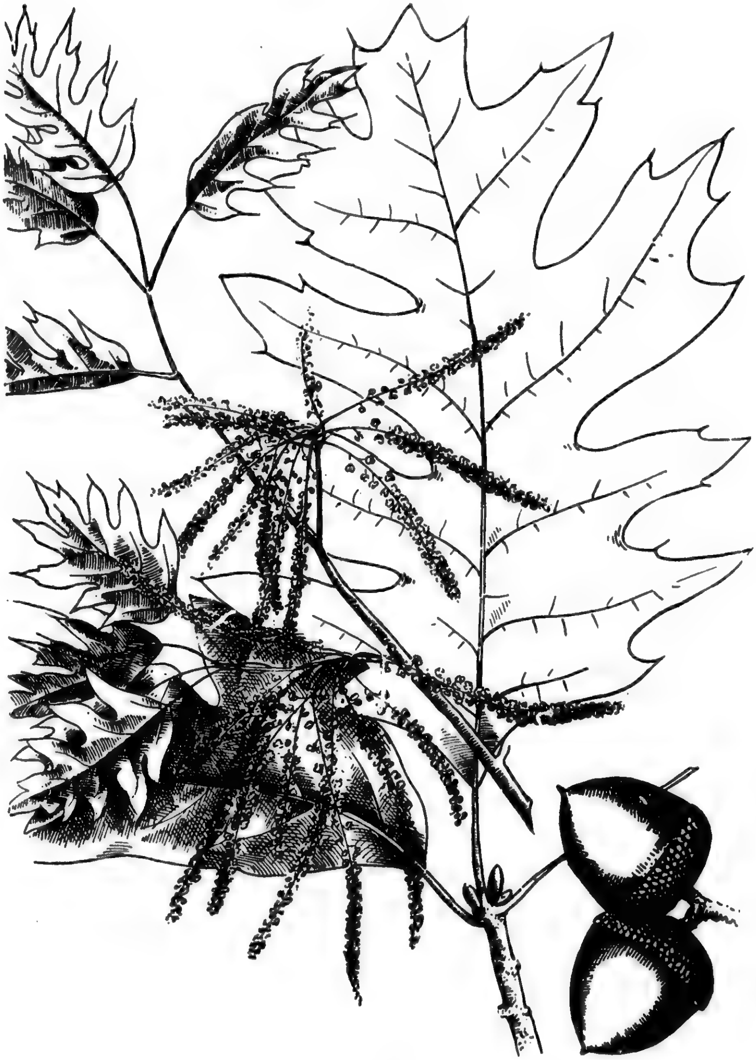


PLATE C. RED OAK. *Quercus rubra.*

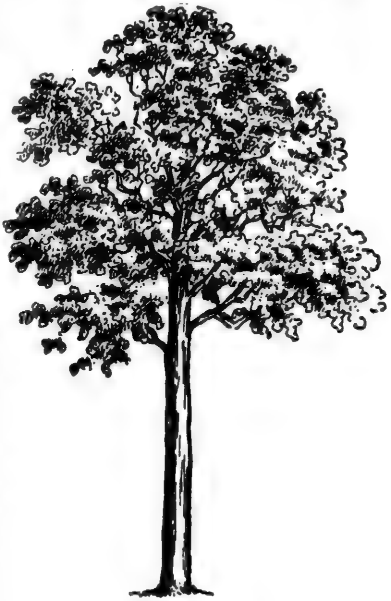
RED OAK. (*Plate C.*)

Quércus rùbra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Round-topped: branches, stout.*	50-80-150 *feet.*	*New Brunswick southward and westward.*	*May, June.* *Fruit: Oct., Nov.*

Bark : reddish brown, smooth for an oak, but rough and broken into scale-like plates. *Leaves :* simple ; alternate ; with smooth, yellowish-green petioles from one to one and a half inches long and oblong or obovate, rather rounded or wedge-shaped at the base and having from nine to thirteen lobes which are irregularly toothed and bristle-tipped at the ends ; the sinuses between them narrowed, rounded and extending about half-way to the midrib. Dark green and glabrous on the upper surface, pale yellow-green below with rust-coloured hairs in the angle of the ribs ; thin. *Staminate flowers:* growing in long, pubescent catkins. *Pistillate ones :* growing on glabrous peduncles. *Acorns :* growing on a short, thick neck or almost sessile. *Cup :* flat ; saucer-shaped ; finely scaled. *Nut :* sometimes an inch long ; ovoid ; bitter.

When the red oak is seen growing in favourable circumstances the effect that it produces is admirable. Usually its foliage is dense, but about it there is no semblance of heaviness. So small a thing as that the lobes of the leaves are unequal in size and have bristle-pointed teeth is quite sufficient to give to the great tree a light, pleasing appearance. But in outline the leaves are very variable. They turn in the autumn to a deep red or orange and are quite without the brilliancy that is associated with the scarlet oak, page 244. The acorns are a good index to the species; for the nut looks wonderfully large and out of proportion to the shallow cup. They are among those that require two years in which to mature. The reddish-brown wood of



Quércus rùbra.

the tree is coarsely grained and thought, in the east, to be of comparatively little value on account of its porous texture. As it occurs westward, however, it is often found to be of better quality. In cooperage it is used and also to make clap-boards.

At Thornedale, at Millbrook, N. Y., there is to-day standing a red oak, the girth of which is twenty-two feet and four inches at a distance of about five feet from the ground. It is a venerable tree and remains like a great, green, trembling cloud upon the landscape. "It was here in father's time, and his father knew it for many years," is said of it, and its age is estimated to be somewhat over two hundred years.

For the reason that the red oak adapts itself readily to various climatic conditions it has been much planted. In Europe it has thrived better than any other one of the American species, many being there on record that are over a century old.

> "Then here's to the oak, the brave old oak,
> Who stands in his pride alone;
> And still flourished he, a hale green tree,
> When a hundred years are gone!"
> —H. L. CHORLEY.

FLOWERING DOGWOOD. CORNELIAN TREE.

(*Plate CI.*)

Córnus flórida.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Dogwood.	*Rounded; branches, spreading.*	12-40 *feet.*	*New England to Minnesota and westward.*	*April-June.* *Fruit: October.*

Bark: blackish or dark red-brown; roughly ridged. *Leaves:* simple; opposite; petioled and mostly clustered at the ends of the branches; elliptical, with pointed or taper-pointed apex and pointed base, often unequal at the sides. Entire; netted-veined; with whitish and distinct ribs; bright green above, glabrous or slightly pubescent; paler underneath and pubescent. *Flowers:* green; tiny; perfect; growing in a rounded, central cluster and surrounded by a showy involucre of four white, obcordate, petal-like bracts, notched at the apex and tinted with pink. *Fruit:* an oval bunch of bright red, ovoid berries.

> "Where cornels arch their cool boughs
> o'er beds of wintergreen."
> —BRYANT.

There are a few among us that do not know and appreciate the

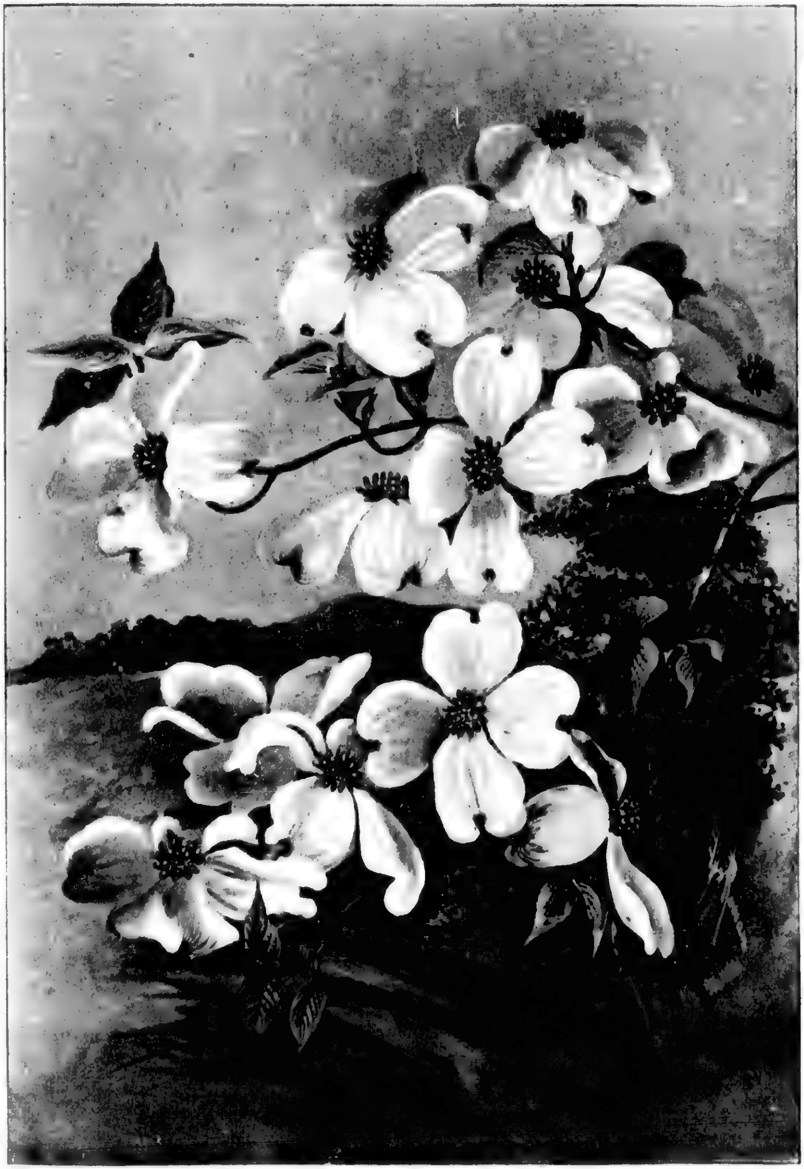


PLATE CI. FLOWERING DOGWOOD. *Cornus florida.*

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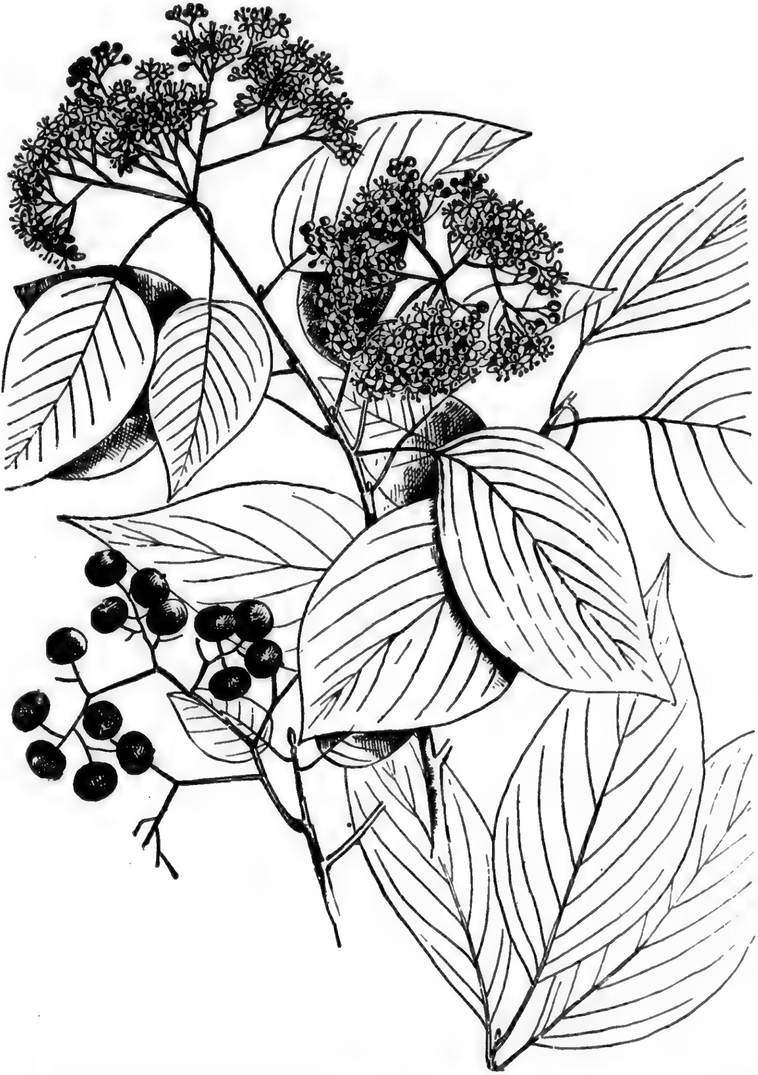

PLATE CII. ALTERNATE-LEAVED DOGWOOD. *Cornus alternifolia.*

beauty of the dogwood when its bloom whitens the woods and banks in early spring. The snowy involucre of the flowers unfolds before the leaves are fully developed and can therefore be seen from a great distance waving its cheery message. Spring has returned, it proclaims, and this is a story that never grows old. The foliage of this tree also contributes much to the brilliancy of the autumn colouring. Then little birds are seen capering in and out among its gay leaves and alighting on twigs that bend low with the weight of their round, plump bodies. They greedily eat the fruit and are good agents in distributing its seeds.

Córnus flórida.

In the south, Cornus florida attains more ample dimensions than it does northward, where it frequently occurs as a shrub. Country people watch the tree with especial interest, for it is credited with coming into leaf at just the right time for planting Indian corn. The bitter bark of its roots contains a powerful substance similar to quinine, and it is used as a tonic. The wood is closely grained and strong, with a beautiful surface like satin.

ALTERNATE-LEAVED DOGWOOD. CORNEL. (*Plate CII.*)

Córnus alternifòlia.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Dogwood.	*Flat-topped, bushy.*	10-30 *feet.*	*New Brunswick westward and southward along the Alleghanies.*	*May, June.* *Fruit: Oct.*

Bark: reddish brown; smooth, or broken irregularly in narrow ridges. *Branches:* yellowish green; smooth, and streaked with white or light brown. *Leaves:* simple; alternate; slender petioled, and crowded near the ends of the branches; elliptical; entire; yellowish green and glabrous above; paler and slightly pubescent underneath between the curved ribs. *Flowers:* small; cream coloured; growing in flat, open cymes, and having no involucre. *Calyx:* with four, minutely-toothed sepals. *Corolla:* of four white, lanceolate petals. *Stamens:* four. *Pistil:* one. *Fruit:* many dark blue berries, growing on reddish petioles.

There is a freshness and vigour about the leaves of this dog-

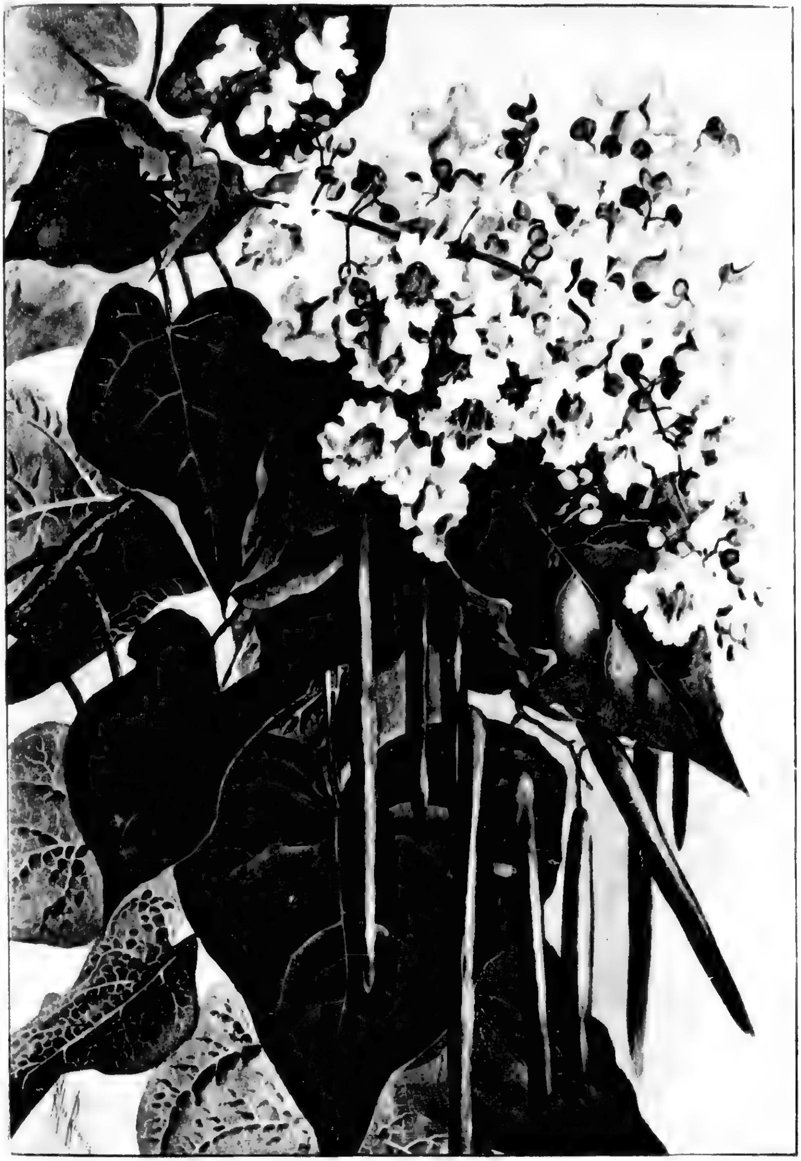

PLATE CIII. CATALPA. *Catalpa Catalpa.*

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wood which can hardly fail to impress us, and they have a strange little way of puffing up in places as though the type of conventional flatness had been routed from their household. Popularly, it has been stated that a first glance at this tree is prone to give rise to just a little uncertainty as to whether its leaves are opposite in growth or alternate. The specimens, however, that were examined to aid in writing this description, had no such pernicious inclinations to lead one astray. The growth of their leaves was all distinctively alternate. The blossoms have no beautiful involucres as have the flowering dogwoods, but a pretty showing is made by the many, tiny flowers that are crowded together in the cymes. In the autumn the foliage turns to yellow and scarlet, and the bright blue berries dangle from coral-coloured stems.

C. circinàta, round-leaved dogwood or cornel, does not attain a dignity beyond that of a shrub of from three to ten feet high. Its branches appear to be covered with warts, and they are streaked with white or green. The leaves are opposite, oval and pubescent underneath. The flowers grow in very dense, flat cymes. In almost any kind of soil the shrub will grow, although it clings with some persistence to the edges and paths of woods. From its bark cornine is largely extracted.

C. stolonifèra, red-osier dogwood and *C. candidíssima*, panicled dogwood, are both conspicuous shrubs along streams and in damp thickets. The twigs of the former species are bright red; those of the latter are ashy in hue.

CATALPA. INDIAN BEAN. CANDLE-TREE. BEAN TREE. (*Plate CIII.*)

Catálpa Catálpa.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Trumpet-creeper.	*Head, broad, rounded; branches, spreading.*	20-30-40 *feet.*	*Gulf states northward.*	*June, July.* *Fruit: Sept., Oct.*

Bark: dark grey; broken into small, flaky pieces. *Leaves:* simple; opposite; with long, round petioles; broadly ovate, pointed at the apex or rarely three-lobed, and slightly cordate at the base; entire; light green above and glabrous; pubescent underneath, especially so along the ribs; peculiarly

scented. *Flowers:* white, mottled with purple inside and spotted with yellow; fragrant; growing in an erect, terminal panicle. *Calyx:* irregular, or two-lipped. *Corolla:* campanulate; two-lipped, with five spreading, crimped lobes. *Perfect stamens:* two; rarely four in two pairs. *Sterile stamens:* three; rarely one. *Pistil:* one. *Pods:* six to twelve inches long; linear; hanging, and containing winged and fragrant seeds.

Catálpa Catálpa.

The catalpa, as the aborigines called it, is one of our most attractive trees, and it is now much seen throughout the middle states. Before being so widely naturalized it was confined to the south. Until taken in the hand and closely inspected the beauty of its blossoms is hardly appreciated. But many of our choicest exotics are not more exquisite. The broad, vivid green leaves form for them a plain and artistic background. Within the pear-shaped, glossy and reddish buds these lovely blossoms are compressed into round balls, in much the same way that an accordion is folded together. It is quite interesting to press a large bud between the thumb and fingers, when it will divide into the two-lipped calyx, and the petals can then be stretched out to their fullest extent. When they are allowed to unfold naturally the stamens and pistil are the first to push themselves upward from their cramped position, and as they do so they bear along with them the pliable corolla. Its lobes are the last of all to open and admit the insects within its richly coloured centre. The crinkling of the lobes is a feature that the flower never loses, and which is owing to their former position in the bud. The pods, especially those of young trees in cultivation, grow very long. When they have become dried and brown, little country boys are credited with finding them good to smoke. Their flavour, however, is very strong, like that of weeds, and they burn the throat most horribly.

C. speciosa, larger Indian bean, often reaches one hundred and twenty feet high and has longer pods than the preceding one.

It is a more valuable species but is seldom found outside of its natural range which is in the vicinity of southern Illinois and the neighbouring states. Its bark and seeds are used medicinally.

SUGAR MAPLE. HARD MAPLE. ROCK MAPLE. SUGAR-TREE. (*Plate CIV.*)

Àcer Sáccharum.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Maple.	*Dome-like, rounded.*	50-120 *feet.*	*New Foundland southward and westward.*	*April, May. Fruit: Sept.*

Bark: light grey; rather smooth, becoming rough and scaly with age. *Leaves:* simple; opposite; with long petioles; rounded in outline, squared or cordate at the base, with three, five or seven coarsely cut and sharply pointed lobes, the lower pair smaller than the other three, and at times, entire; sinuses, rounded. Rich green and glabrous above, lighter below and pubescent, especially so along the ribs. *Flowers:* greenish yellow; growing on drooping pedicels in sessile, abundant corymbs, and appearing with the leaves. *Calyx:* bell-shaped; fringed. *Petals:* none. *Sámaras:* greenish yellow; drooping on slender, hairy pedicels; the wings broad and slightly spreading; about one inch long.

This is one of the very good trees. It is so perfect in outline, so beautiful and useful. Perhaps it is most widely known through its sap, from which is made the main quantity of maple sugar. A square block of this well-known article of commerce, however, can hardly disperse the same love that is felt for the tree by those living in its neighbourhood, and who look eagerly forward to the time when sugar is made. Then is the tree's yearly festival.

Àcer Sáccharum.

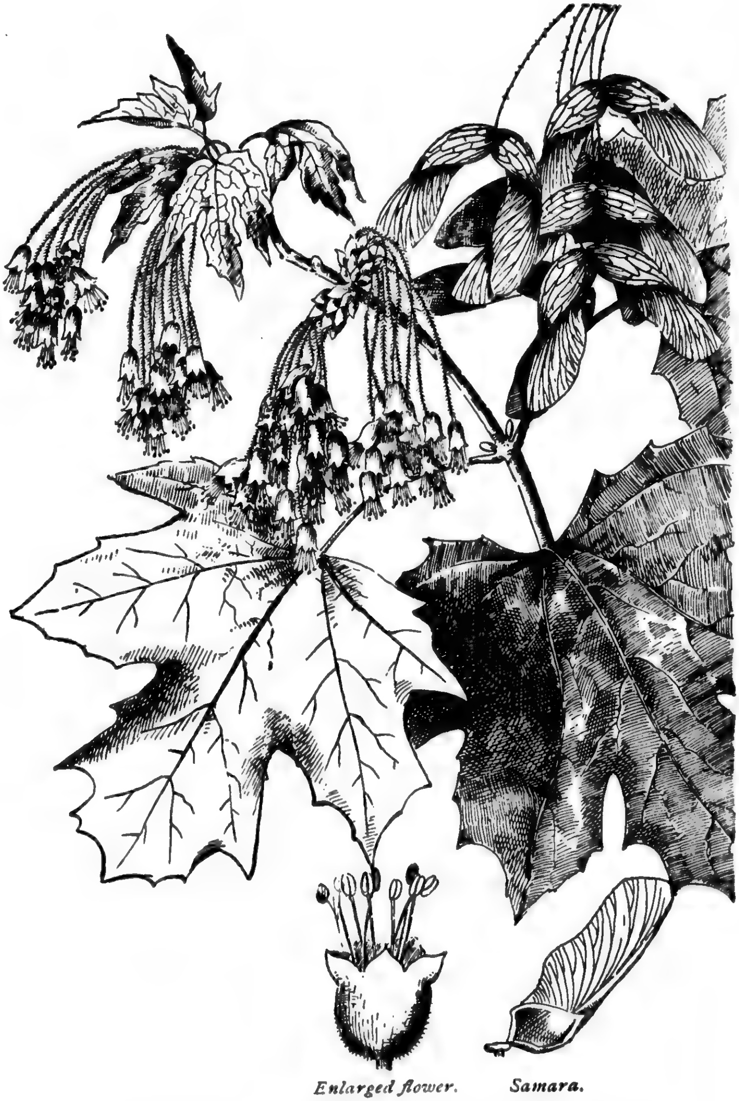

PLATE CIV. SUGAR MAPLE. *Acer Saccharum.*

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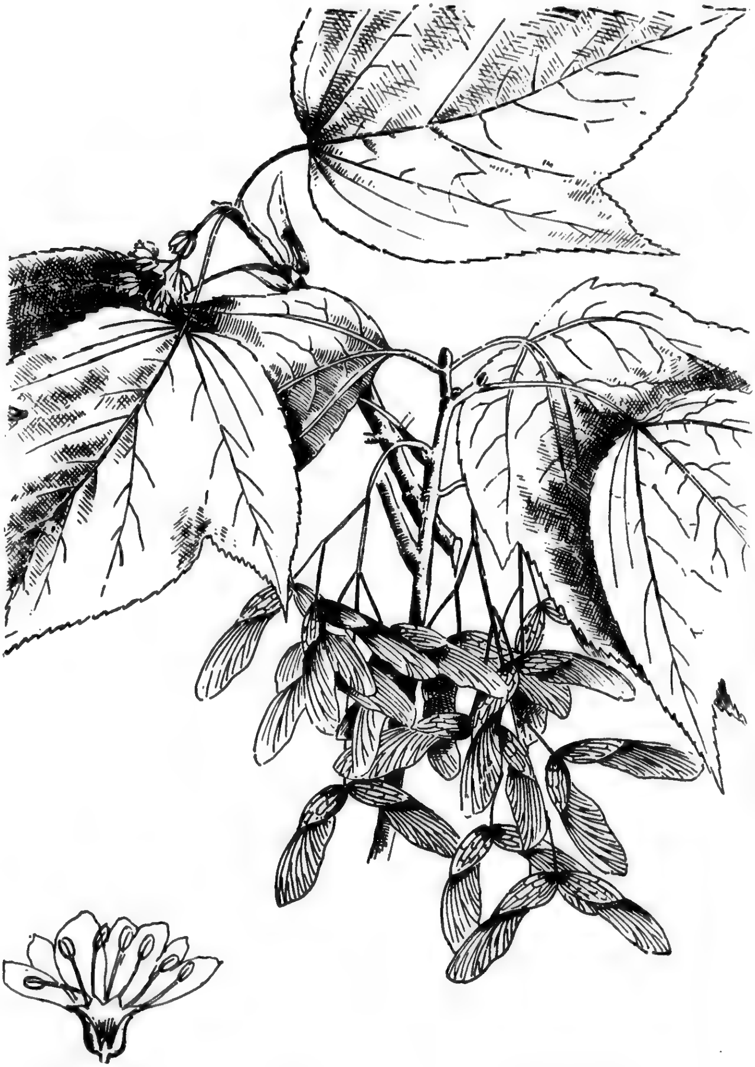
In earliest spring, as soon as the sap begins to flow freely, the trees are tapped, and a wooden quill or trough is inserted in the opening. At its other end is placed a bucket. The sap then is averted in its upward course and directed into the trough from where it trickles slowly down into the bucket. About seventy drops fall every minute,—that is, under favourable circumstances and when the tree is well warmed by the sunshine. This flow of the sap continues about three weeks. There is then a gathering of the country about to enjoy the "sugaring off." Great fires are built in the woods, and over them kettles containing the sap are hung. This is the signal for a general frolic among the girls and men of the village, although stirring, tasting and sampling the syrup are not forgotten. It must be taken from the fire at just the time that it has turned to sugar. In certain parts of the country as in Vermont, where the making of maple sugar is a large industry, it commands great attention and is done after the most scientific methods. In New York state there is a belt which includes Schoharie, Otsego and Delaware counties and embraces Wayne and Susquehanna counties in Pennsylvania that is yearly becoming more famous for its production of maple sugar. In fact, the last census shows the yield to be a little below one hundred thousand pounds. A tree of average size produces yearly, it has been estimated, from four to eight pounds of sugar.

The wood of the sugar maple is more valuable than that of any other of its genus. It is reddish brown, heavy and strong, and capable of receiving a high polish. From it shoe lasts, pegs and a large amount of furniture are made. When it is burned for fuel its ashes even are valuable, for they contain a considerable amount of potash.

Bird's-eye maple and curled maple are so called from different conditions of the wood which arise from peculiar undulations of its fibre.

A. nigrum, black sugar maple, often grows along streams or inhabits river bottom lands. It is known from the preceding



Enlarged flower.

PLATE CV. STRIPED MAPLE. *Acer Pennsylvanicum.*

species by its almost black bark and the formation of its leaves, which is, however, very variable. Usually the lobes are severely cut and have few or no teeth. The sinuses are long and narrow, and on both sides the leaf is of the same colour. Even when old it retains a soft down underneath. When the base of the leaf is heart-shaped the lobes not infrequently overlap each other. Of the samaras, the wings are rather wide, but hardly more so at the bottom than at the top. From the sap of this tree also sugar is made.

STRIPED MAPLE. GOOSEFOOT MAPLE. MOOSEWOOD.

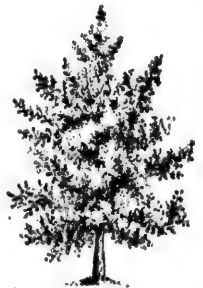
(*Plate CV.*)

Ácer Pennsylvánicum.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Maple.	*Slender; branches, upright.*	10-35 *feet.*	*Nova Scotia westward, southward to Georgia and Tennessee.*	*May, June.*

Bark: reddish brown or greenish; conspicuously striped longitudinally with lines of pale blue; smooth, and having upon it rough excrescences. *Leaves:* large; simple; opposite; with stout, grooved petioles; rounded or cordate, with three lobes above the middle; sinuses pointed; finely and doubly serrate. Glabrous above and below, slightly pubescent when young. *Flowers:* yellowish green; growing in terminal, drooping racemes and appearing after the leaves have unfolded. The sterile and fertile flowers grow in different clusters on the same tree. *Samaras:* pale green, with widely diverging wings; glabrous.

Dame Nature was surely in one of her jocund moods when she gave so many fine little touches to the striped maple. The bud-scales are very attractive, and as the leaves unfold in the springtime they cover the tree with a burst of faint rose colour. Its racemes of delicate flowers sway in the tree like tassels. The brilliancy of its green garb and the gay yellow tint to which it turns in the autumn, make it one of the most beautiful trees in cultivation. In outline its leaf has been thought to suggest a goose's foot from the way in which it widens towards the summit and divides into



Ácer Pennsylvánicum.

three well-cut lobes. The peculiar vertical marking of the trunk is also a beautiful and characteristic feature and makes it easy for us to retain our friendship with the tree during the winter. The striped maple is a shrinking character and loves to hide itself under the shade of larger trees. It frequently occurs as a shrub. In fact in New England it forms an immense amount of undergrowth. To it are sometimes attached the names of false, or striped, dogwood. Its name of moosewood was bestowed on it because in early spring deer browse on the young shoots, that they may enjoy its sugar-like sap.

MOUNTAIN MAPLE. (*Plate CVI.*)

Àcer spicàtum.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Maple.	*Slender, tapering.*	12-30 *feet.*	*New Foundland westward and southward to N. Carolina and Tenn.*	*May, June.*

Bark: brown or greenish; not striped. *Leaves:* three to five inches long; simple; opposite; rounded in outline, with three or rarely five lobes, pointed at the apex and coarsely serrate. Above glabrous; pubescent underneath when young; soft; flexible. *Flowers:* greenish yellow; growing in erect, dense clusters and unfolding after the leaves. *Petals:* linear; spatulate. *Samaras:* growing in clusters from nine to ten inches long, the wings diverging at right angles.

It is always a source of wonderment why Acer spicatum remains so persistently under the shade of other trees. It could well defy the full light of day that might fall upon it in an open place, for it is very beautiful. At the north it rarely occurs as other than a tall shrub and clings to the rich woods or grows by well-shaded roadsides. In the coloured illustration the delicate samaras of the mountain maple are seen wearing their fresh, green tint of youth. Later, in the autumn, they turn to brown. The foliage then becomes a brilliant red or a clear, deep orange. It is to the maples, we should remember, that we owe the

Àcer spicàtum.

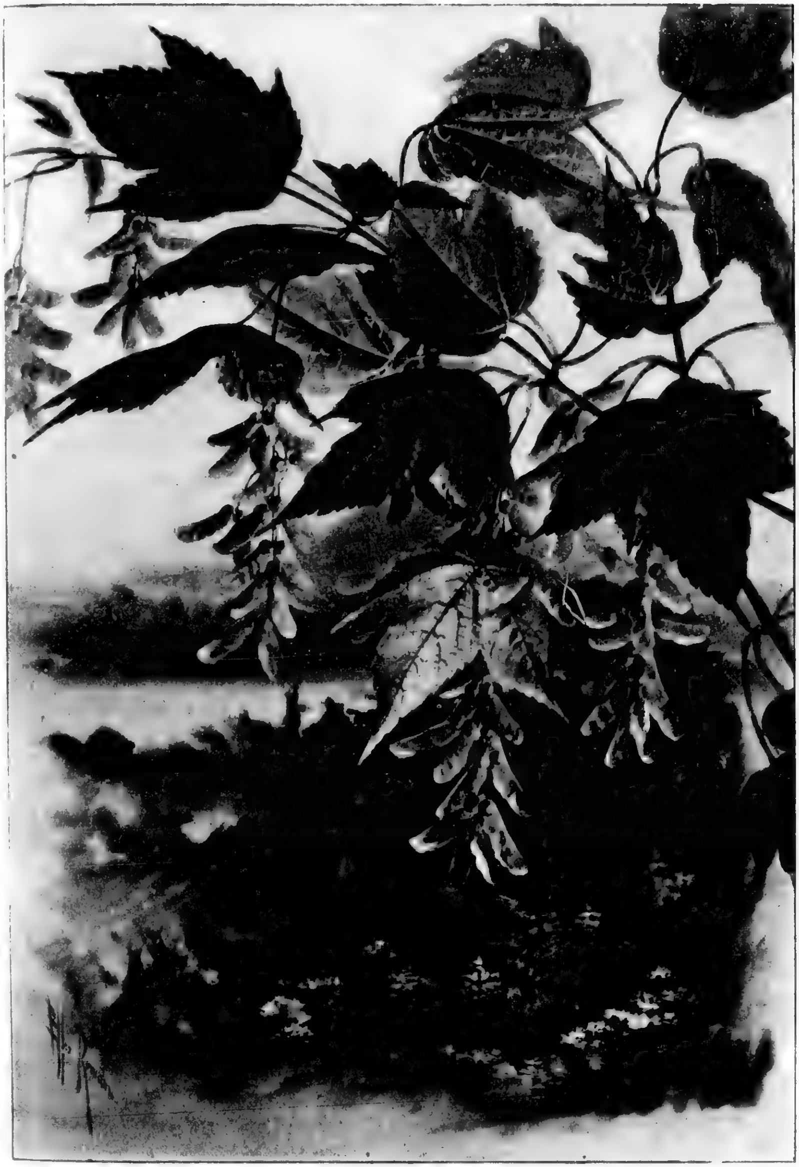


PLATE CVI. MOUNTAIN MAPLE. *Acer spicatum.*

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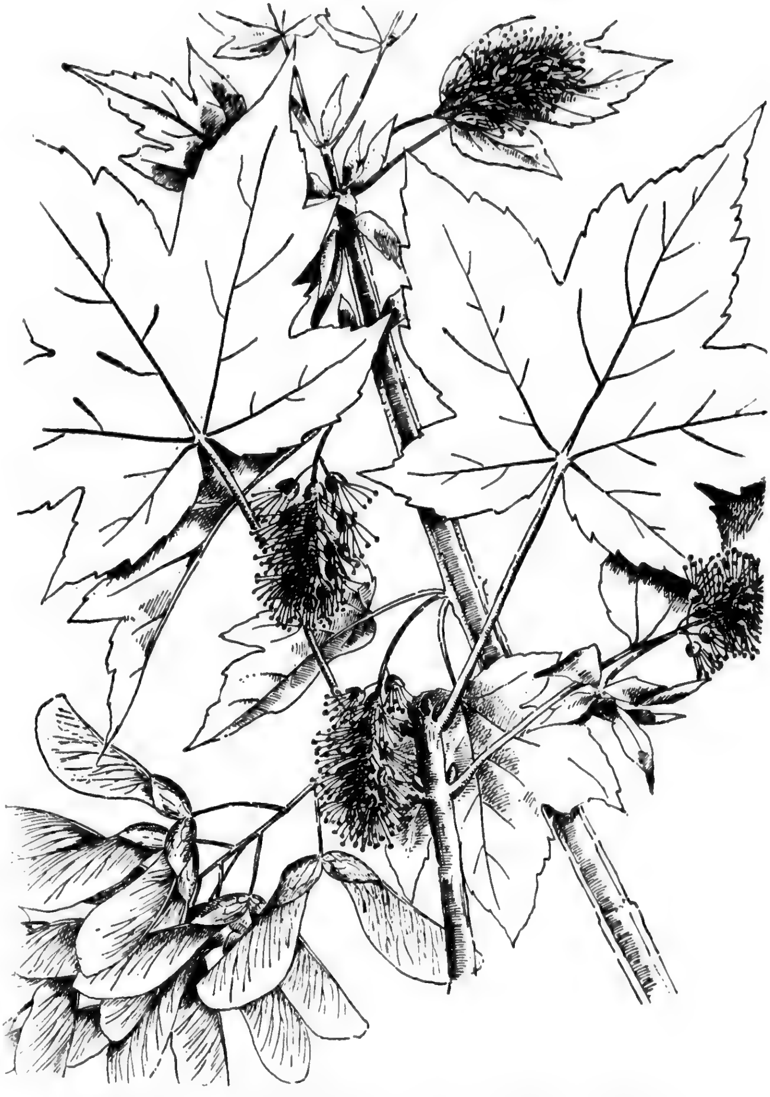

PLATE CVII. FALSE SYCAMORE. *Acer Pseudo-Platanus.*

greater part of the glorious colouring of the autumn. The individual trees remain ever true to their colours and turn every year to the particular ones that they have chosen. A beautiful sight is to see two different maples standing closely together when one has changed to scarlet and the other to clear, bright yellow.

A. plantanoìdes, Norway maple, is one of the introduced maples with which we are becoming familiar along drives in parks and in general cultivation. It is a handsome tree, rounded in outline and with broad, thin and smooth leaves, which must luxuriate in the wealth of light and sunshine they are capable of absorbing. In shape they are similar to those of the sugar maple ; the lobes however are short, five to seven in number, and have from two to five sharply pointed teeth. The corymb-like clusters of fruit are a distinctive feature, the wings being frequently two inches long and diverging so as to form almost a straight line. Another mark of the tree's identity is that the leaf-stem contains a milky juice.

A. Pseudo-Platanus (*Plate CVII.*), false sycamore, is another European species that is extensively planted for ornament in this country. Its beautiful, firm leaves have very long, red petioles and five short lobes which are coarsely and irregularly toothed. The sinuses are pointed. On the upper surface the leaf is a rich green, but underneath it is a much lighter, softer colour. In its fruiting season the tree is hung with a long raceme of pubescent samaras with wings that diverge widely.

Àcer Pseùdo-Platánus.

A. Japónicum atropurpùreum, blood-leaved Japanese maple, is one of a number of dwarf maples which is mentioned here because it is now becoming frequent in cultivation. It is

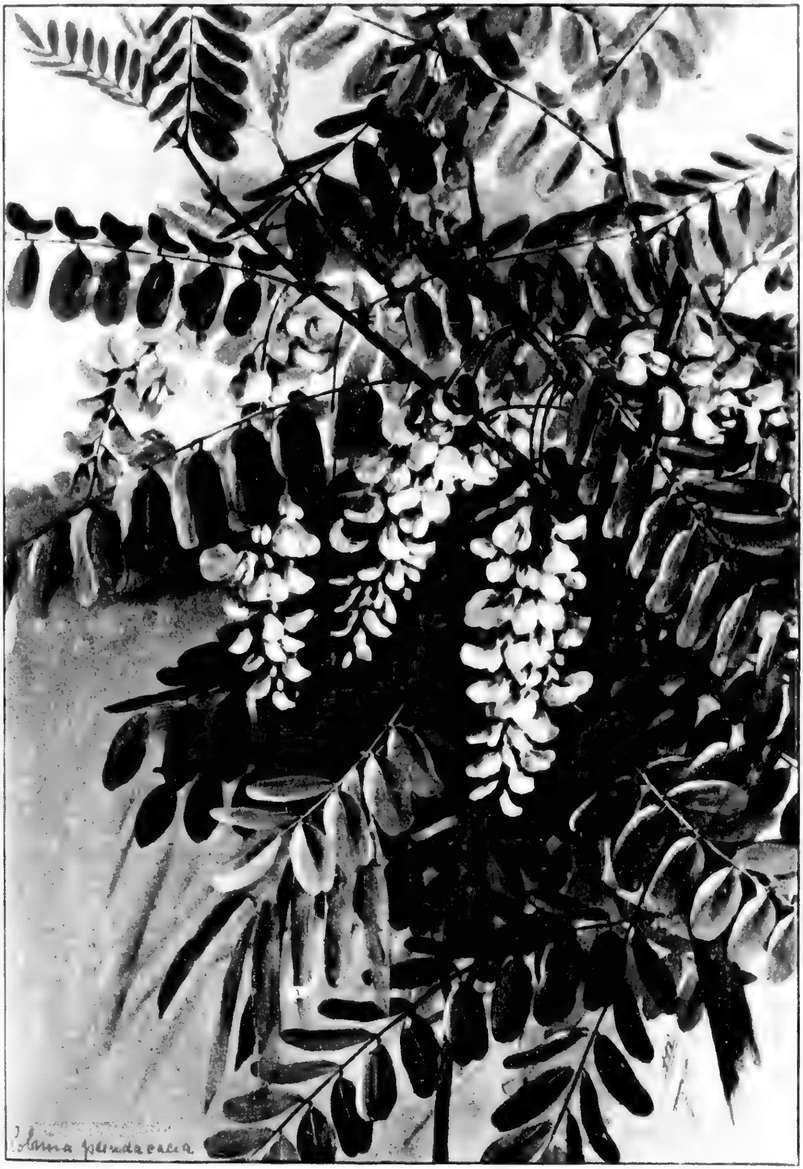

PLATE CVIII. LOCUST TREE. *Robinia Pseudacacia.*

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extremely beautiful with rich wine-coloured foliage and a graceful manner of growth.

LOCUST TREE. YELLOW LOCUST. FALSE ACACIA.

(*Plate CVIII.*)

Robinia Pseudacàcia.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pea.	*Head, narrow, oblong; branches, erect.*	40-50 *or* 80 *feet.*	*Penn. southward to Ga. and westward.*	*May, June. Fruit: Sept.*

Bark: reddish brown; rough and broken in ridges. *Stipules:* linear and later developing into spines. *Leaves:* compound; alternate; with leaf-stalks that are hollowed at the base and which cover the buds of the succeeding year; odd-pinnate, with from eleven to twenty-five oval leaflets; rounded at both ends and occasionally tipped with the end of the midrib; entire; netted-veined; glabrous; when unfolding covered with a silvery pubescence. ***Flowers:*** white; fragrant; growing in loose, axillary racemes. *Calyx:* five-toothed. *Corolla:* showy; papilionaceous; the standard yellow at the base. ***Legumes:*** linear; glabrous and containing from four to six brown seeds. They remain on the trees over the winter.

> "The slender acacia would not shake
> One long milk-bloom on the tree.
> The white lake-blossom fell into the lake
> As the pimpernel dozed on the lea;
> But the rose was awake all night for your sake,
> Knowing your promise to me;
> The lilies and roses were all awake,
> They sigh'd for the dawn and thee."—TENNYSON.

It is not only when the bright sun of mid-day is shining that trees are well seen. On some tranquil night in early summer, lit by a bright moon, the locust tree is clearly defined as it rises to its stately height and casts about its fantastic shadows. Its clusters of moving, sensitive blossoms also appear to be thrown into prominence by the dimness of other things. It is then free from the labour of digesting and assimilating the sap, which work it does in the sunshine, and calmly leans

Robinia Pseudacàcia.

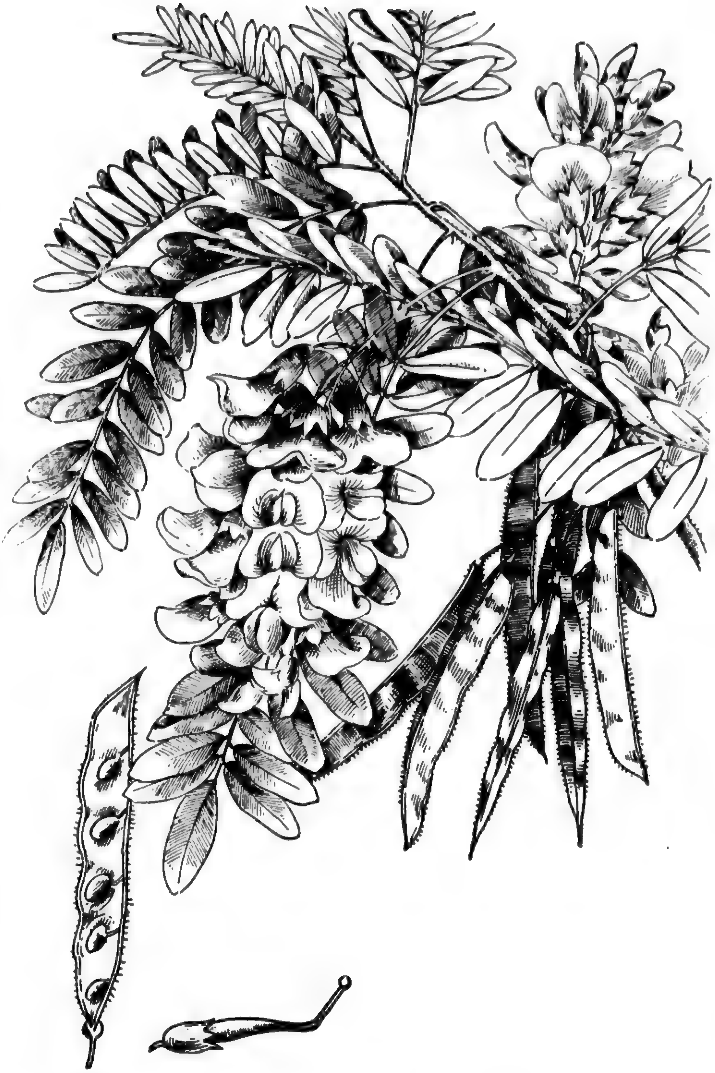

PLATE CIX. CLAMMY LOCUST. *Robinia viscosa.*

PLATE CX. ROSE ACACIA. *Robinia hispida.*

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upon the cool night breezes. The luscious honey scent the flowers cast about is one of its most seductive charms. There is in the southern part of New Jersey an avenue of these trees which for many generations was the admiration of those that passed beneath them. Then a certain borer, called painted clytus, found them out and set about the poor work of destruction. Such ravages have thus been made among these trees that to-day many of them are but dark, uncanny stumps with a mass of suckers growing from their tops. Now and then one is seen that has for some reason been less molested than the others, and it stands out as though to testify to the departed glory of its comrades. In fact, away from its native forests it is almost impossible to protect the tree from such damage. This is unfortunate, as its beauty has caused it to be perhaps more planted in Europe and in America than any other tree.

The wood of the locust tree is very valuable. It is closely grained, heavy and especially strong when in contact with the ground. Above all others it is preferred for the making of treenails, and it is used for posts in vessels and for the masts of ships. Long ago its excellence was known to the Indians of Virginia, and from it their bows were constructed.

CLAMMY LOCUST. (*Plate CIX.*)

Robínia viscòsa.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pea.	*Slender; branches, spreading.*	30-40 *feet.*	*Virginia to Georgia.*	*June.*

One of the differences between this species of Robinia and the preceding one is that its rough leaf-stems and branchlets are clammy. Then it is a smaller tree and sometimes descends to a shrub of from five to ten feet high. Its pink flowers grow in erect or drooping, compact racemes. They are very showy, but their colour hardly compensates for the sweet scent and more graceful growth of the flowers of *Robinia Pseudacacia.* Still it is one of our most rare and beautiful trees, and it is to be lamented that it does not occur more generally in a wild state. It seems, however, to have a natural taste for luxury. From the mountains of Carolina, where it is particularly charming, it has escaped, and it is seen in cultivation throughout the Middle and Eastern States and in Canada. Its legumes are linear-lanceolate, and they are slightly tipped with a vestige of the style.

ROSE ACACIA. BRISTLY LOCUST. MOSS LOCUST.

(*Plate CX.*)

Robinia hispida.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pea.	*Slender, spreading.*	3-10 *feet.*	*Virginia southward.*	*June.*

Bark of branches: Purplish. *Leaves:* compound; alternate; with leaf-stalks that are hollowed at the base and which cover the buds of the succeeding year; odd-pinnate, with broad leaflets, tipped with long bristles. *Flowers:* large; showy; deep rose colour and growing in rather loose racemes. *Corolla:* papilionaceous; the standard large. *Legumes:* linear, and covered with bristles.

A glance at this lovely plant is enough to cause it to be associated with the family to which it belongs, although it is the one that is shrubby in its habit of growth. When in bloom it is a soft, brilliant sight, and the papilionaceous corolla reminds us strongly of many of our wild flowers.

"Is it a tree," a little child asked with amazement, "or is it a big flower?"

By plucking one of its leaves it is seen that it takes the same precocious care of its offspring as is customary with other members of the genus. The base of the long stalk is hollow, and nestling cosily within its centre is the young bud of the next season. Here it is as completely sheltered and hidden away from harm as though a little house were built about it. Throughout the northern states we are now accustomed to seeing the shrub, as it is widely cultivated for ornament.

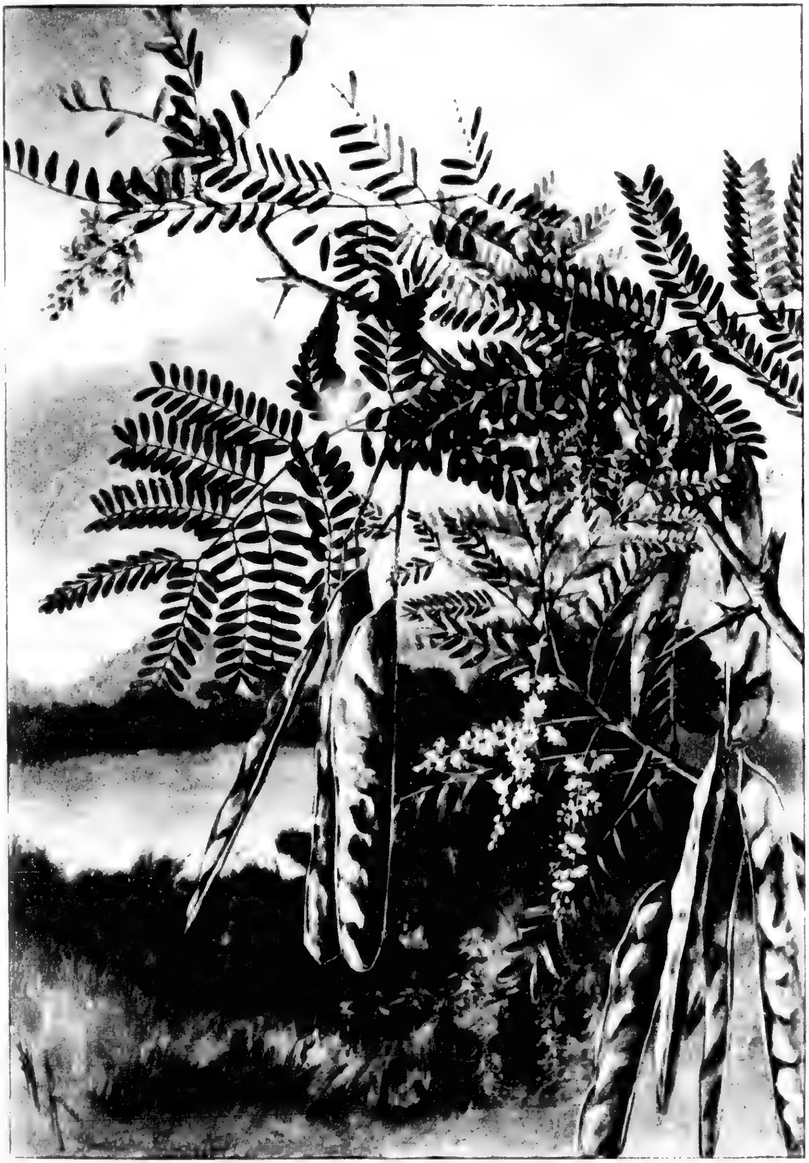

PLATE CXI. HONEY LOCUST. *Gleditsia triacanthos*

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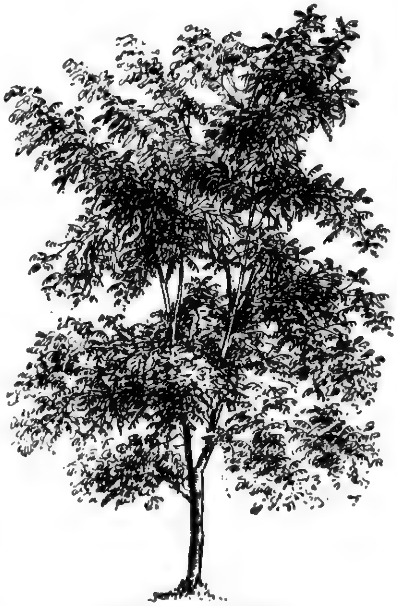
HONEY LOCUST. THREE-THORNED ACACIA. HONEY SHUCKS. (*Plate CXI.*)

Gledítsia triancánthos.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Senna.	*Irregular.*	75-140 *feet.*	*Western N. Y. southward and westward.*	*May, June.*

Bark: grey and rough, with small scales at the base of the trunk. The young branchlets reddish brown and having upon them wart-like excrescences. *Spines:* two to four inches long; twice or thrice branched and curved at the base. In very young and old trees they are sometimes absent. *Leaves:* compound; alternate; with long, downy petioles; abruptly pinnate, or twice pinnate with from ten to twenty-six or more long, oblong leaflets tapering towards the apex and rounded at the base; entire or slightly toothed; dark green and lustrous above, yellow green below; glabrous; thin. *Flowers:* greenish white; growing in narrow racemes. *Calyx:* three to five cleft. *Corolla:* with from three to five narrow, spreading petals. *Legumes:* nine to twenty inches long; reddish brown; flat; linear; curved and containing between the seeds a sweet substance which has suggested the name of honey locust.



Gledítsia triancánthos.

It seems as though there were no motion quite as undulating and graceful as that of a tree with an abundance of fine foliage. This the honey locust has, and about it there is something very interesting. As though to atone for the fact that its leaves are abruptly pinnate, a growth never as pleasing as when they are terminated by an odd leaflet, or by a tendril, the end leaflet often again divides itself, and the leaf becomes twice pinnate. In this way it satisfies its desire for a mass of fleecy, light foliage. Growing on the branches just above the axils of the leaves, or where the leaflets grow in little clusters, the long, sharply-pointed and richly-coloured thorns appear. But they are not more curious to look at than are the great pods which hang on the tree late in the season. One is really inclined to wonder where they came from. As they twist themselves like corkscrews in drying they produce an eccentric effect. This is not their object, however ; they have simply devised this plan as a means of securing a wider distribution of their seeds.

The tree is now widely planted throughout the north, and it is often chosen to form hedges. That it withstands the onslaught of insects and grows rapidly from the seed are strong points in its favour. It comes into leaf, however, late in the spring when nearly all the other trees are already clothed with verdure.

AMERICAN YELLOW-WOOD. KENTUCKY YELLOW-WOOD. (*Plate CXII.*)

Cladrástis lùtea.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pea.	*Head, broad; branches, spreading.*	30-50 *feet.*	*Eastern Ky. to Tenn. and North Carolina.*	*May, June.*

Bark: silvery grey; close, something like that of the beech. *Branches:* ashy. *Leaves:* compound; alternate; with stalks that are hollowed at their bases and enclose the buds of the succeeding year; odd-pinnate; with from seven to eleven oval or ovate leaflets ; pointed at the apex and rather blunt at the base; entire; light green above; lighter below; glabrous. *Flowers:* white; fragrant; hanging in full, terminal panicles often a foot or more long. *Corolla:* white; papilionaceous; the standard large and turned backward. *Fruit:* many linear flat pods which hang from short peduncles and contain from four to six seeds.

There is something mystical about the great bunches of this tree's flowers when they unfold, and a strangeness lurks in seeing things so purely white hanging from its boughs. When the sun shines upon them after a shower, they sparkle as with innumerable drops of crystallized dew, and tiny, round specks of reflected sunshine gleam over their white petals. It is interesting to notice their colours. Sometimes they blend crimson,

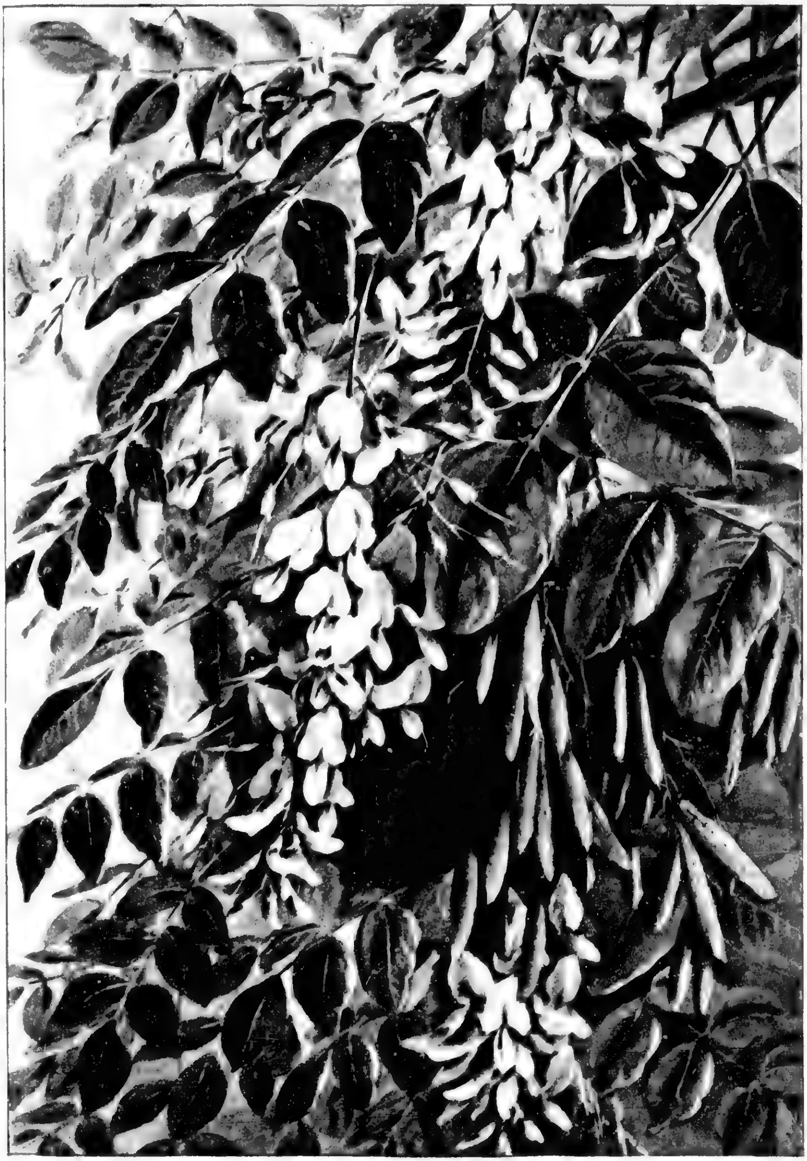


PLATE CXII. AMERICAN YELLOW WOOD. *Cladrastis lutea*

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yellow and green. The crimson tint is bordered with grey, and the green sinks away into a deeper blue. Every season there are flowers to be seen on the tree, although it is only on alternate years that it throws out its full wealth of bloom. More than a fortnight they seldom last, and in warm weather hardly as long. In cultivation it would be difficult to imagine a more beautiful, low-growing tree than the yellow-wood; for besides its flowers, its foliage is extremely graceful and changes in the autumn to various tints of gold.

Cladrástis lútea.

The wood of Cladrastis lutea is light yellow and brittle. In fact its branches are very prone to break when they are struck by a high gale of wind.

KENTUCKY COFFEE-TREE. STUMP TREE. (*Plate CXIII.*)

Gymnócladus dioíca.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Senna.	*Head, narrow; branches, ascending.*	40-80-110 *feet.*	*N.Y. and Penn. southward and westward.*	*May-July.* *Fruit: Sept., Oct.*

Bark: grey, tinged with red; coarse; rough and separating into persistent scales. *Branches:* few and having no thorns. *Stipules*: lanceolate. *Leaves:* one to three feet long; unequally twice-compound; alternate; odd-pinnate; with from seven to thirteen leaflets on each division of the blade; ovate; taper-pointed at the apex and rounded or cordate at the base; entire and fringed about the margins. Dark green and glabrous above, pale yellow-green below and slightly pubescent along the ribs. *Flowers:* white; diœcious; growing in racemes along the branches. *Legumes:* large; six to ten inches long, and broad; reddish brown; flat; glaucous and containing several hard and grey seeds.

It is a pleasure to feel that we know just what to expect from trees—that they are not with every return of the season presenting us with new fashions. We may have noticed that the late, unfolding leaves of the Kentucky coffee-tree are pink, and that as they become more accustomed to the world they

Gymnócladus dioìca.

turn to a bronze-green. In the autumn they again change to bright, clear yellow. Nor is it only in one particular year that these colours succeed each other. At whatever time we return to the tree, no matter how long afterwards, we shall find it telling the same story. A spray of its doubly-compound leaves readily adapts itself to conventional designing. The curved pods remain unopened on the boughs throughout the winter, when the tree has a lamentably dead and stump-like look. Their seeds were at one time used to make a beverage which was thought to be something like coffee.

BLACK WALNUT. (*Plate CXIV.*)

Jùglans nìgra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Walnut.	*Rounded; branches, very thick.*	30-60-150 *feet.*	*Mass. southward and westward.*	*April, May.* *Fruit: October.*

Bark: blackish; rough; broadly ridged. *Twigs:* pubescent. *Leaves:* compound; alternate; with stalks from one to two feet long, which are slightly pubescent; odd-pinnate, with from thirteen to twenty-three leaflets; ovate-lanceolate; taper-pointed at the apex and rounded or slightly cordate at the base; the sides often unequal, and the lower pair of leaflets smaller than the others; sharply toothed; yellowish green above and glabrous, paler below and pubescent. *Fruit:* large; globose; solitary; the husk greenish yellow when ripe and dotted with brownish red; spongy and decaying to release the nut. *Nut:* black; deeply and sharply furrowed, and containing a rich, highly flavoured kernel.

It has been estimated that fully one hundred years are required for this tree to attain the ample proportions necessary for a valuable timber tree. Then the axeman who long has had his eye on it, lays low the result of its patient, unerring growth. How pathetic is this defenselessness of the tree against man!

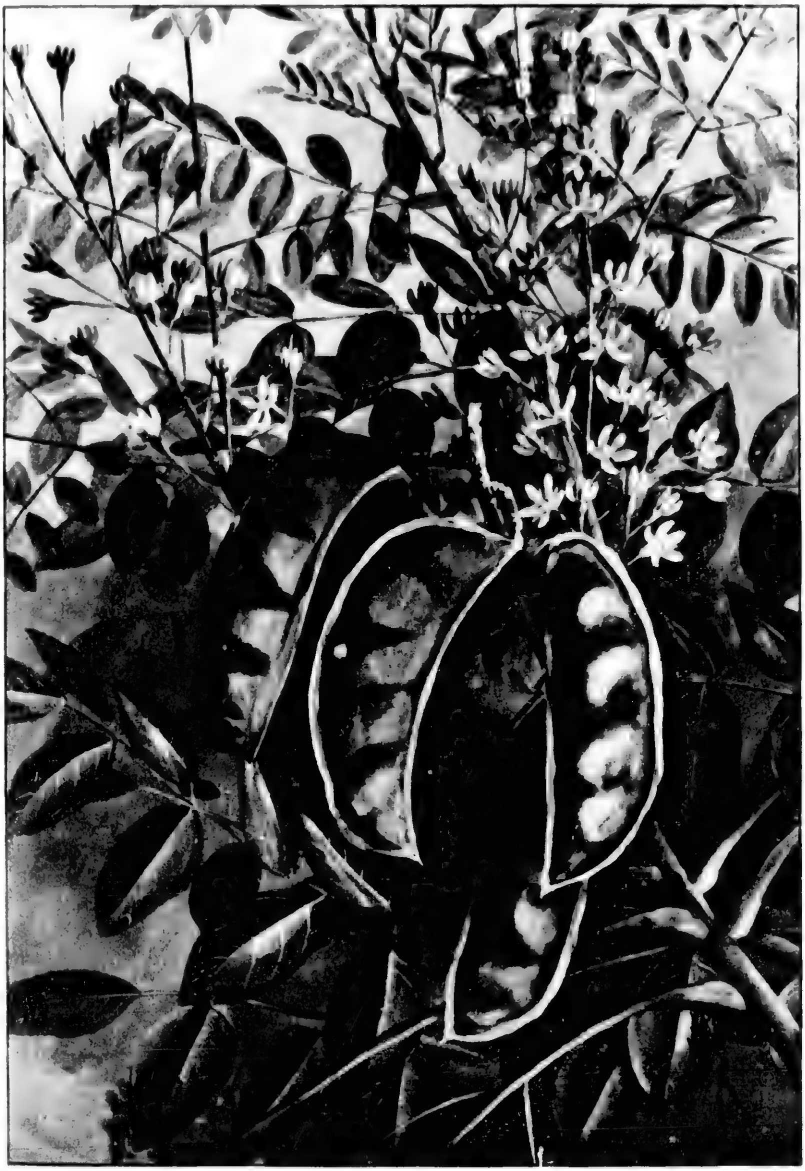

PLATE CXIII. KENTUCKY COFFEE TREE. *Gymnocladus dioica.*

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Júglans nigra.

Long before him it knew the earth, and it has outgrown him; but meekly it falls before his will. So great has been the demand for the beautiful, dark brown heart-wood of the black walnut that it may now almost be said to no longer exist in the American forests. And many of the trees that are approaching a marketable size have already been bought "on the stump" by lumbermen. Those trees that once covered vast tracts of forest land in the Mississippi basin are now no more, and east of the Alleghany mountains they are also scarce. During the civil war gun stocks were largely made of the wood of the black walnut, and trees were not planted to replace those that were destroyed. As we all know, the meat of the nuts has a fine, rich flavour; but it is somewhat difficult of access, as it is most skilfully fastened within the shells. In cultivation the tree has a sombre aspect, and it is unfortunate that the fall web-worms eat so ravenously its foliage.

BUTTERNUT. WHITE WALNUT. OILNUT. (*Plate CXV.*)

Júglans cinèrea.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Walnut.	*Unsymmetrical; branches, horizontal.*	30-50-100 *feet.*	*New England southward to Ga. and westward.*	*May.* *Fruit: Oct., Nov.*

Bark: light brown; deeply ridged. *Branchlets:* light grey; rough. *Twigs:* sticky. *Leaf-buds;* scaly; pubescent. *Leaves:* compound; alternate; with pubescent and sticky stalks; odd-pinnate, with from eleven to seventeen long, oval, sessile leaflets, taper-pointed at the apex and rounded at the base; sharply and unevenly serrate; yellowish green above, underneath extremely pubescent. *Flowers:* monœcious. *Staminate catkins:* growing from axillary buds. Their flower bracts clothed during the winter with tomentum; pubescent. *Pistillate flowers:* six or eight, growing in terminal spikes, and covered with sticky hairs. *Fruit:* growing in a husk from two to three inches long; oblong; pointed; green or greenish brown when ripe; sticky, and decaying away from the nut that it encloses. *Nut:* ovate; with a rough, furrowed shell, and sweet, highly flavoured kernel.

As is often true of trees that come into leaf late in the season, the butternut is one of the first to take offence at Jack Frost; and that he may not further wound it by his familiarity, its leaves drop silently to the ground very early in the autumn. At all times the leaves of the tree are rather scarce, and its exposed grey limbs present an unkempt appearance. So much yellow is mixed with the colouring of the foliage that, while the effect is peculiar, it robs it of all look of vigour. The trees remind us of plants that have been too much in the shade.

But how insignificant are such points as these to the country boys and squirrels that know the tree by its fruit. And how sweet and tender is the young meat, only those know that have braved the staining of fingers and have pounded the husks open on some near-by rock. Perhaps the taste of the woodlands still clings to them, for they are seemingly very different when bought at the market.

The wood of the butternut is light brown and beautiful. Among other things it is used for cabinet work.

MOCKER-NUT. WHITE-HEART HICKORY. FRAGRANT HICKORY. (*Plate CXVI.*)

Hicòria alba.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Walnut.	*Head, rounded, narrow; branches, spreading.*	70-100 *feet.*	*New England southward to Fla. and Texas and westward.*	*May, June.* *Fruit: Oct., Nov.*

Bark: light grey; rough, but close; not broken into scales. *Leaf-buds:* large; round, and covered with yellowish-brown scales. *Leaves:* compound; alternate; odd-pinnate; with rough stalks and from seven to nine long, oval, almost sessile leaflets, taper-pointed at the apex, and wedge-shaped or blunt at the base; the lower pair of leaflets smaller and broader than the others. Slightly serrate with blunt teeth; above deep yellowish green, paler and pubes-

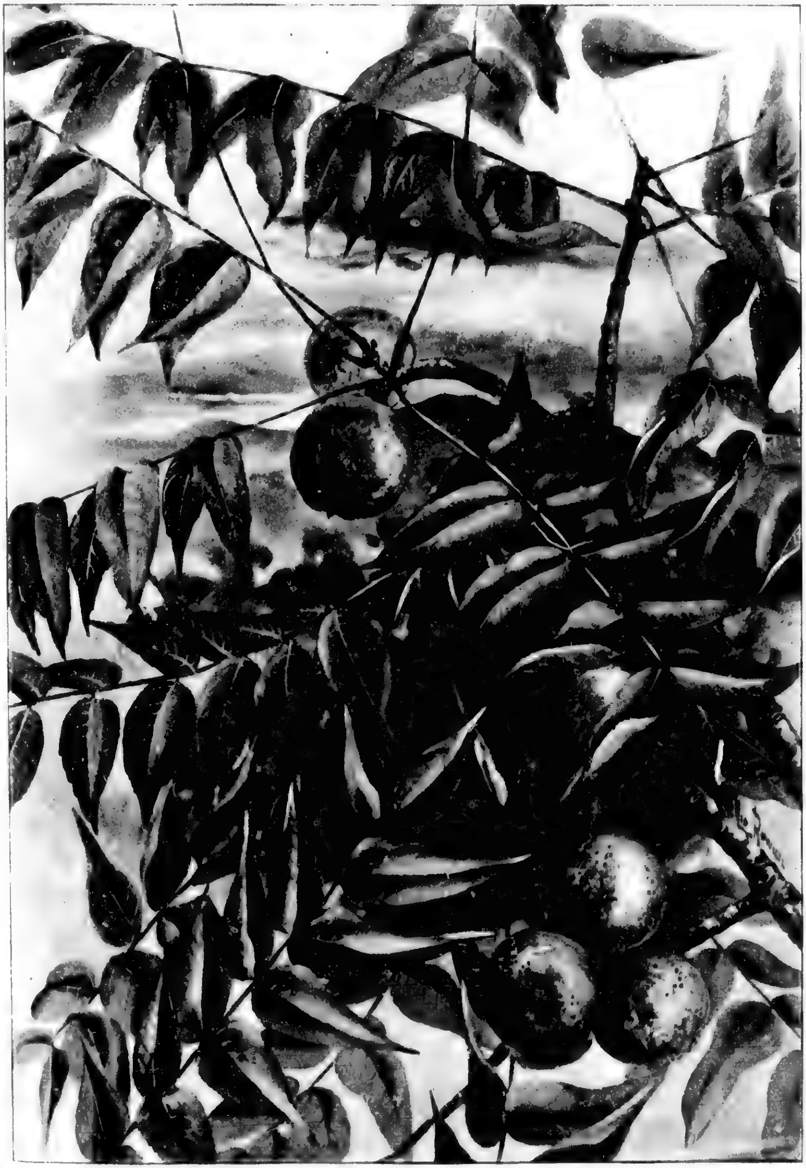

PLATE CXIV. BLACK WALNUT *Juglans nigra.*

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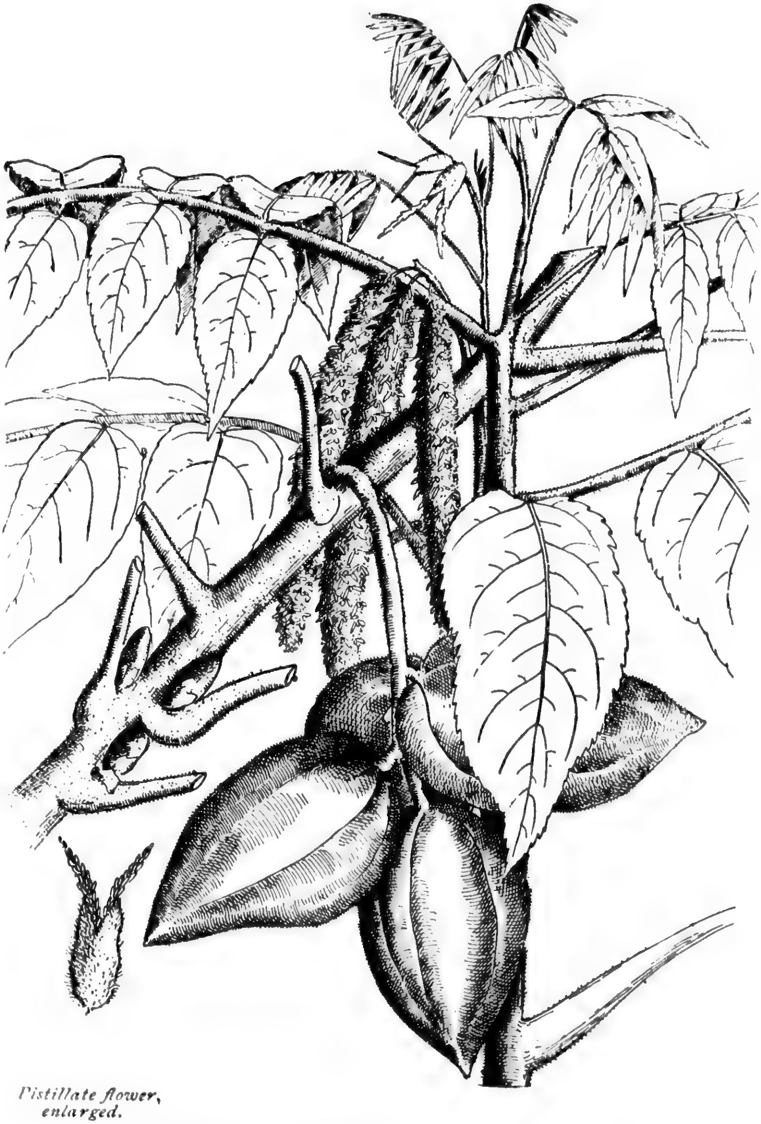
Pistillate flower, enlarged.

PLATE CXV. BUTTERNUT. *Juglans cinerea.*

cent underneath; fragrant when dried. *Nut:* one and a half to two and a half inches long; greyish white, and growing in a thick green husk, which splits when ripe nearly to the base into four sections; ovate; rounded; pointed at the top; six-angled, with a hard and thick shell. *Kernel:* small; sweet, but not highly flavoured.

It is true that the fruit of this tree is one that mocks. Its large size and fresh, wholesome look lead many to seize it as though with a promise of finding abundant meat. But a series of disappointments is consequent. The husk of the nut is unusually thick, and the shell is thick; so when found the poor little meat seems not to compensate for the trouble it has given, especially as it is indifferently flavoured. To follow the changes of colour of the tree's large leaf-buds is interesting. In the winter their yellowish-brown scales forsake them, and they become covered with those that are hard and greyish. It is not well to be conspicuous late in the season when delicate, green food is scarce; for there are hungry marauders about then as well as in the summer time, although not perhaps of the same class as the beautiful but terrible creature which is seen in the coloured plate.

Of all the hickories this one is the most generally known throughout the south. It grows also in the Atlantic states and in Canada, but in these latter places it is rather rare. In the rich soil of woods, or upon hillsides and ridges it is found. The timber that the tree produces is very similar to that of the shag-bark hickory.

SHAG-BARK HICKORY. SHELL-BACK HICKORY. WHITE WALNUT. (*Plate CXVII.*)

Hicòria ovàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Walnut.	*Conical: head, narrow; trunk, column-like.*	50-90-120 *feet.*	*Southern Maine westward and southward to Fla. and Texas.*	*May.* *Fruit: Sept., Oct.*

Bark: grey; loosely attached, and breaking into long, loose strips, which curve away from the tree at the bottom but remain attached at the middle. *Leaf-buds*; ovate; large; with leaf-like, brown and yellow-green scales. *Leaves:* compound; alternate; odd-pinnate; with rough stalks and five or seven leaflets;

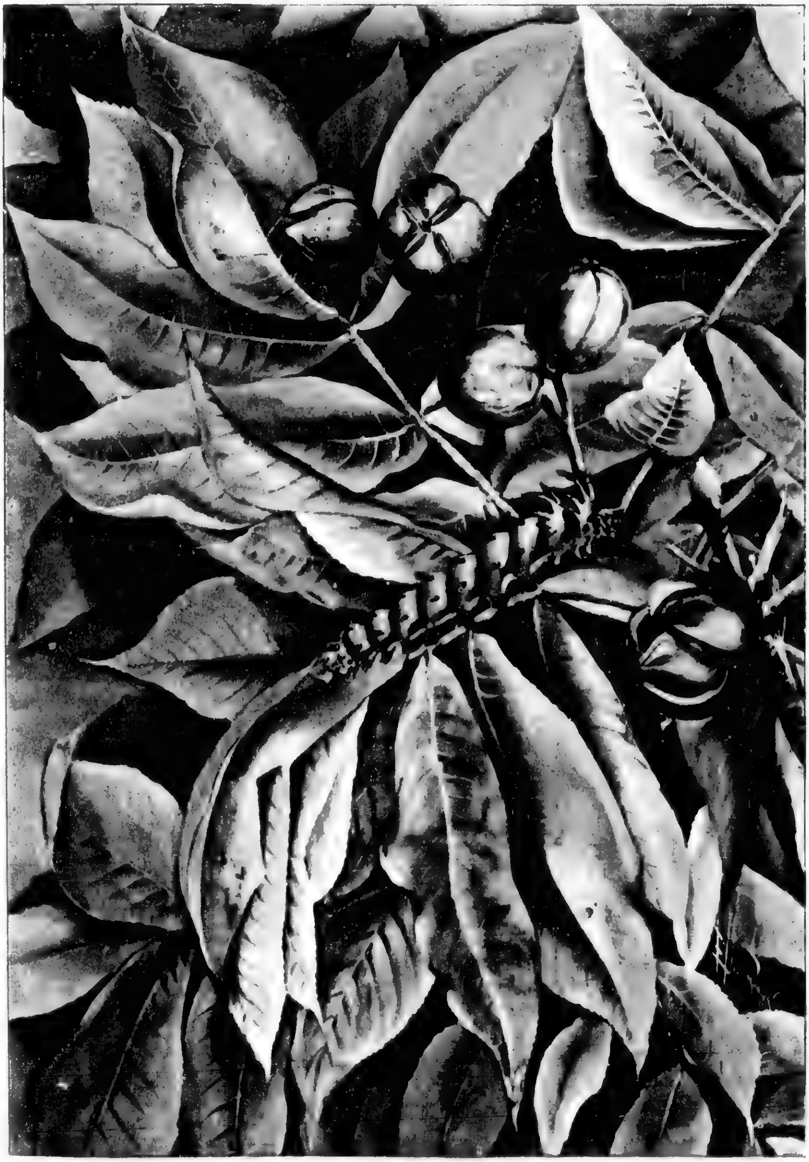

PLATE CXVI. MOCKER-NUT. *Hicoria alba.*

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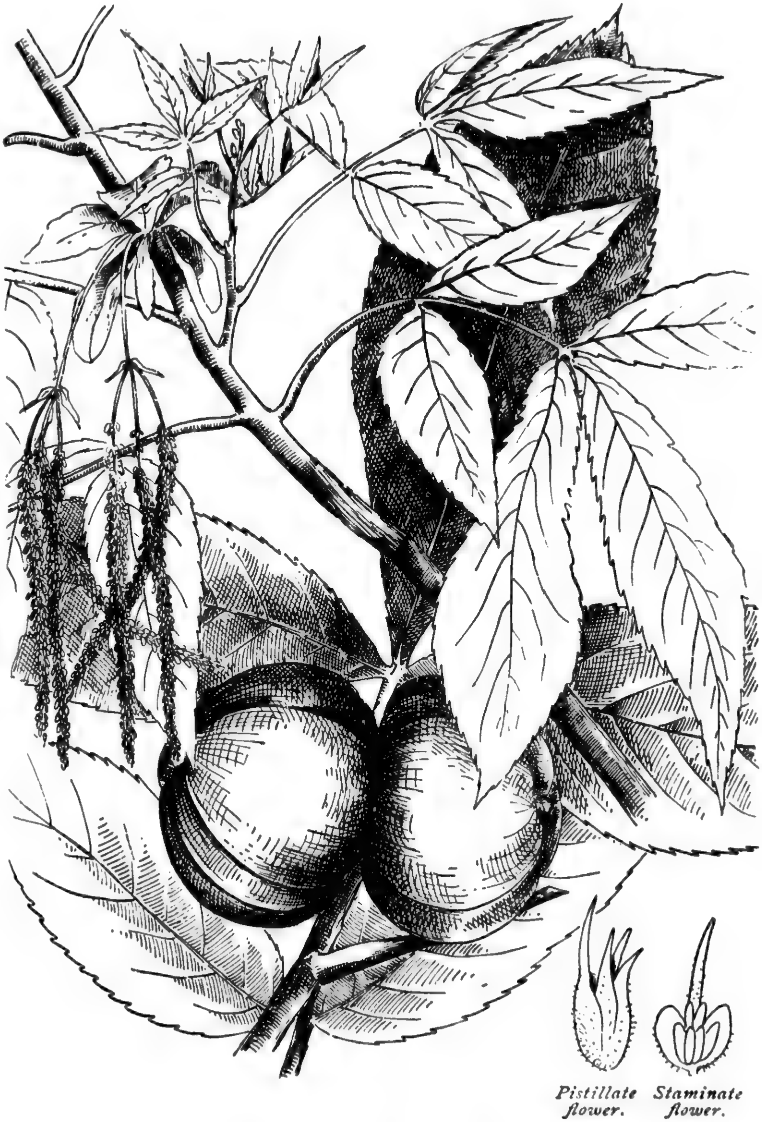

Pistillate flower.
Staminate flower.

PLATE CXVII. SHAG-BARK HICKORY. *Hicoria ovata.*

long ovate, or obovate; se with taper-pointed apex and wedge-shaped or rounded base, the lower pair of leaflets varying greatly from the others in shape; sharply serrate; thin; dark yellowish green, and glabrous above; paler below. *Flowers:* appearing after the leaves are nearly fully grown. *Staminate catkins:* light green; slender, and growing in threes on long peduncles. *Pistillate ones:* in spikes of from two to five flowers. *Fruit:* growing in a thick, green husk; smooth and lustrous on the outside, and opening to the base into four sections. *Nut:* whitish; ovate; flattened at the sides; four-angled, and containing a sweet, highly flavoured kernel.

After the beautiful buds have burst their bright, petal-like scales, the shag-bark equips itself for the summer with a green sunshade of fresh and fragrant leaves. And it is also a sunshade that is picturesque and exquisite in outline. There is besides no need of putting on one's spectacles before bowing to the tree. Its strange, shaggy bark at once proclaims its identity, and formality is forgotten. With tranquil steadiness it produces every year its fruit—a dainty gift to mankind. Were it only for its own purposes of reproduction there would be no need of its having so fine and sweet a flavour. It is the well-known hickory nut of the market. Those that wander much in the woods know well that a bit of self-restraint is necessary in the early autumn; for these nuts will not be hurried in their ripening, and no more pleasure is to be had from gathering them too soon than there is from trying to unfold for oneself the petals of a rose.

The brownish-white wood of the shag-bark is tough, elastic and very valuable. Its uses are many.

H. laciniòsa, big shell-bark, or king nut, is a rare tree which occasionally grows one hundred and twenty feet high, and is found in rich soil from New York and Pennsylvania southward and westward. It has a light grey bark which separates into thin, narrow plates, and the young branchlets are orange colour. The leaves are from ten to twenty inches long and have from five to nine obovate leaflets. Either solitary, or in pairs, the nuts grow, and they are much larger than those of the shag-bark hickory. In fact, to one that sees them for the first time, their size is astonishing. Their shell is also darker, with a yel-

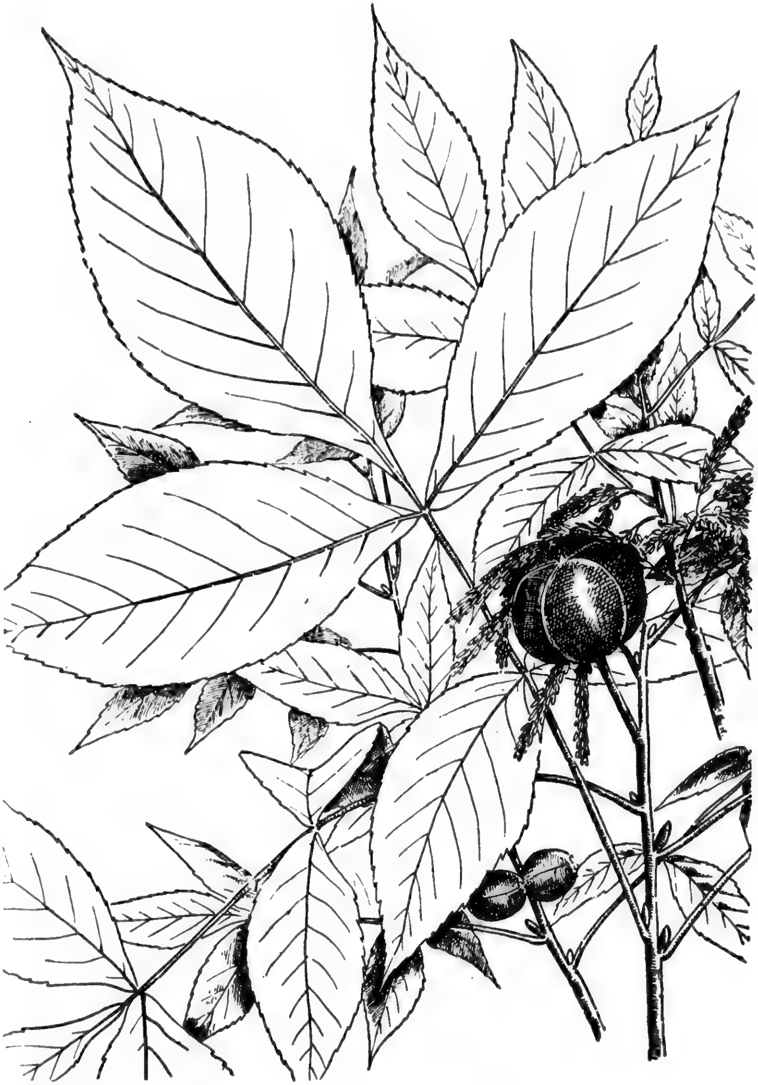


PLATE CXVIII. SMALL-FRUITED HICKORY. *Hicoria microcarpa.*

low tint, and the kernel, although sweet, has a less agreeable flavour. Hicoria laciniosa is slow of growth, and the wood that it produces is comparatively dark in colour. Otherwise there is much similarity between it and that of *Hicoria ovata.*

SMALL-FRUITED HICKORY. (*Plate CXVIII.*)

Hicòria microcàrpa.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Walnut.	*Rounded, conical.*	60-90 *feet.*	*Mass. to Delaware and westward.*	*May, June.* *Fruit: Sept., Oct.*

Bark: at first close, but separating into narrow strips. *Leaves:* compound alternate; with smooth stalks and from five to seven sessile leaflets; long; oval; pointed at the apex and at the base; finely serrate; glabrous above and only slightly pubescent in the angles of the ribs underneath and dotted with dark spots. *Fruit:* growing in a nearly globular, green, thin husk which splits when ripe nearly to the base. *Nut:* small; round; smooth; not ridged; thin-shelled. *Kernel:* sweet.

It is not always a simple matter to tell at a glance the different hickories apart, for in general habit and picturesqueness of outline they closely resemble each other. The foliage of Hicoria microcarpa suggests that of *Hicoria glabra,* the pignut, and the shell of its small fruit is also thin and free from angles. In fact, Professor Sargent regards the tree as a variety of *Hicoria glabra.*

About the leaf-buds of the hickories there is always a charm. Many of them grow to the size of quite large leaves before falling and are full of colour. Usually the pistillate blossoms are green, and so unobtrusive and modest are they that they might readily be mistaken for the unfolding foliage. The wood of the small-fruited hickory is light brown, tough and strong.

WHITE ASH. (*Plate CXIX.*)

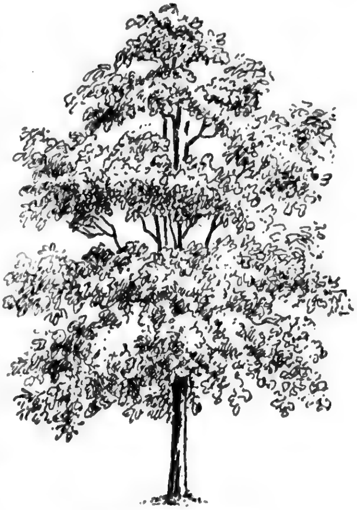
Fráxinus Americàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Olive.	*Rounded; lower branches, slightly drooping.*	40-120 *feet.*	*Nova Scotia westward and southward to Florida and Texas.*	*April-June.*

Lower bark: brownish grey, tinged with red; furrowed, and becoming smoother upward and on the branches. Young shoots glossy, and marked with light coloured dots. *Leaf-buds:* rust coloured; glabrous and growing in elongated panicles. *Leaves:* compound; opposite; odd-pinnate; with from five to nine ovate, or lance-oblong leaflets; taper-pointed at the apex and pointed or inclined to be rounded at the base and extending into smooth petiolules about one quarter of an inch in length. Dark green and lustrous above, silvery underneath and pubescent, becoming glabrous at maturity excepting on the whitish under ribs. *Flowers:* diœcious; appearing before the leaves. *Staminate flowers:* with three stamens which have short filaments and conspicuous anthers. *Pistillate ones:* with their ovaries extended into a slender style and having a purple, spreading, two-lobed stigma. *Samaras:* hanging on slender pedicels in loose clusters; the wings lanceolate and tapering to a point.

> "Why lingereth she to clothe her heart with love,
> Delaying as the tender ash delays
> To clothe herself, when all the woods are green?"
>
> —TENNYSON.

In the Eddas, the records of Scandinavian mythology, it is told that a mighty ash tree, "Ygdrasil," sprang from the body of the giant Ymir who under it lies prostrate. It is thought to support the whole universe. One of its great roots penetrates into the dwelling of the gods, another into the abode of the giants, and the third extends into the realms of darkness. Each root is watered by a spring. In the abode of the gods it is tended by three Norns; they are goddesses who dispense fate and represent the past, the present and the future. The spring in the giant's hall is Ymir's well and holds in its depths wit and wisdom. But the third spring feeds the adder, Nidhogge, darkness, which never ceases from gnawing at the tree's roots. Four harts ceaselessly traverse the branches and bite off the buds. They are the four winds. After their creation of the universe, these gods also conceived the first man, Aske, to be made out of an ash tree,



Fràxinus Americàna.

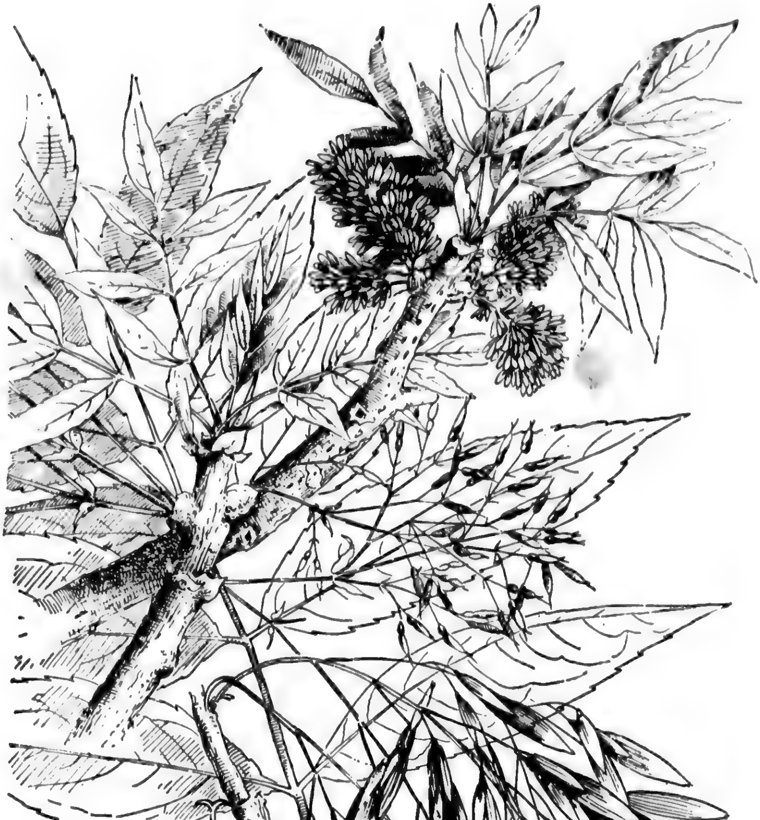


PLATE CXIX. WHITE ASH. *Fraxinus Americana.*

and the first woman out of an alder. She was called Embla.

The white ash is an especially handsome tree of rapid growth and with clean foliage that is not ravaged by insects. Its flexible, fine timber is of great value in cabinet work and is well adapted for the making of oars, carriage poles, shafts and agricultural implements.

BLUE ASH. (*Plate CXX.*)

Fráxinus quadranguláta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Olive.	*Slender.*	60-100 *feet.*	*Ontario to Minnesota and southward to Alabama.*	*March, April.*

Bark: light grey; tinged with red and divided irregularly into plate-like scales. *Branchlets:* squared; four-angled. *Leaves:* compound; opposite; odd-pinnate; with from five to nine or more long ovate or lanceolate leaflets with very short petiolules, or nearly sessile. Apex and base taper-pointed; sharply serrate; yellowish green; dull and glabrous above, pale and glabrous below, but downy in the angles of the ribs when young. *Flowers:* diœcious; insignificant; growing on slender pedicels from separate buds in the axils of the leaf-scars of the preceding year, and unfolding as the terminal bud expands. *Samaras:* hanging in clusters; narrowly oblong; the wings extending all around and nearly the same width throughout; notched at the apex.

In rich woods and on the fertile bottom lands of the west the blue ash is mostly found. But even throughout its natural range it is not a common tree. As is true of nearly all the members of its family, it is beautiful and unusually free from objectionable features. It grows rapidly to a tall and stately height, and its foliage has happily no blandishments for the insect world. In the autumn it turns to a pale yellow, and although the leaves have unfolded late in the spring, just when the samaras are forming, they are among the first to fall. The mark by which the tree is most readily known is the quadrangular shape of its stems. It has, however, been popularly stated that they lose this feature as they grow old. But Mr. Beadle, of Biltmore, who has grown several hundred thousands of blue ashes, finds that from the first to the tenth year of their age there is a strong increase in this characteristic, and that to some extent it is always retained.

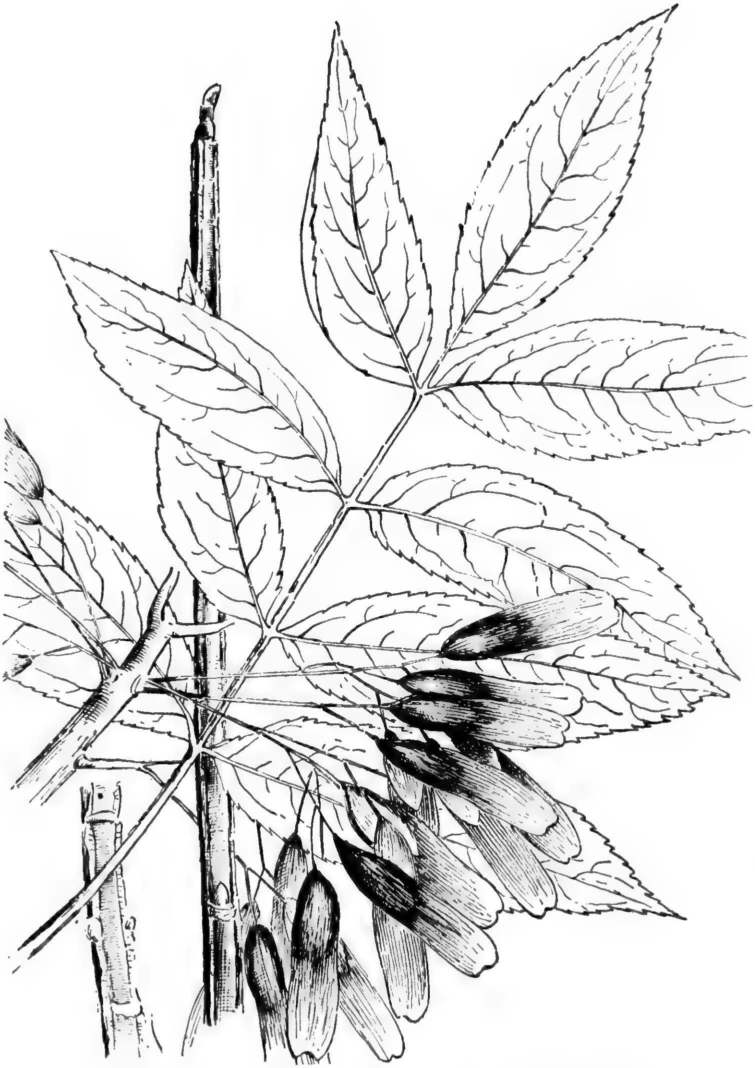


PLATE CXX. BLUE ASH. *Fraxinus quadrangulata.*

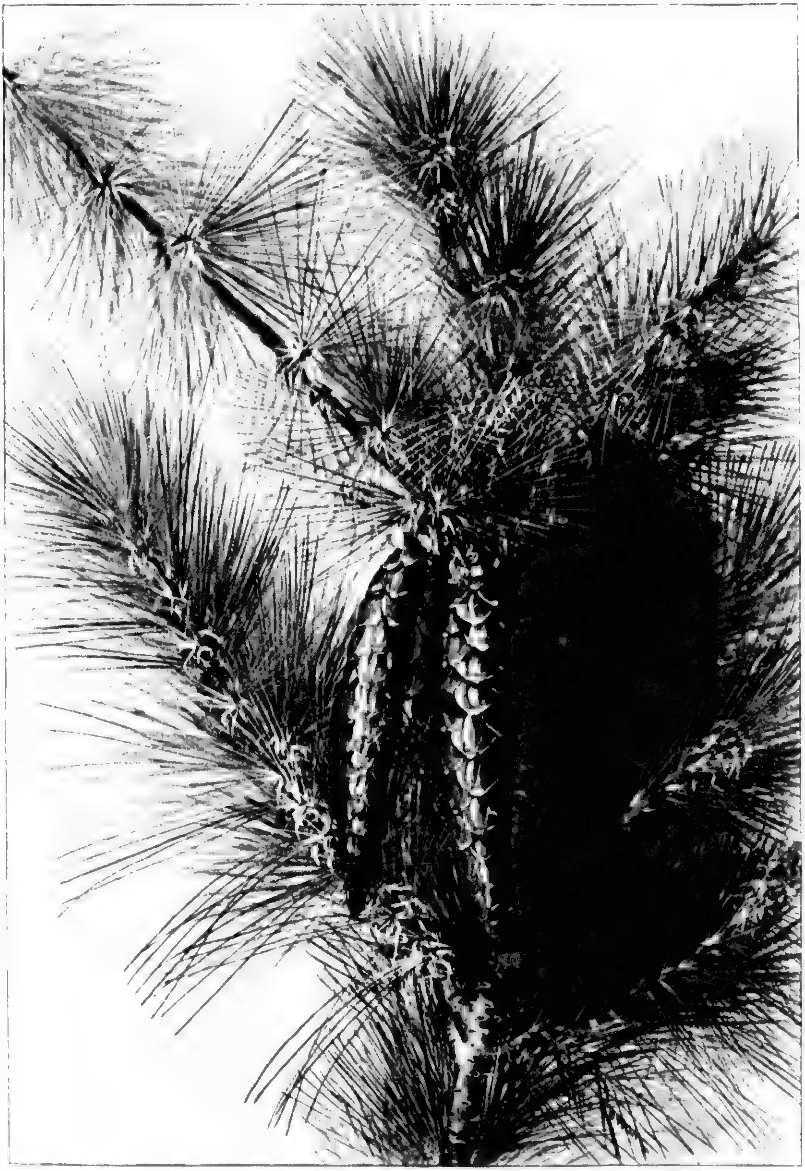


PLATE CXXI. WHITE PINE. *Pinus Strobus*.

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The dark, yellowish wood of the blue ash is valuable. It is not very strong, but hard, and is adaptable for such purposes as flooring and parts of carriages. Commercially, it is not distinguished from the other ashes of the northern and middle states. From its inner bark a blue dye is extracted and to this circumstance is owing the tree's common name.

WHITE PINE. WEYMOUTH PINE. (*Plate CXXI.*)

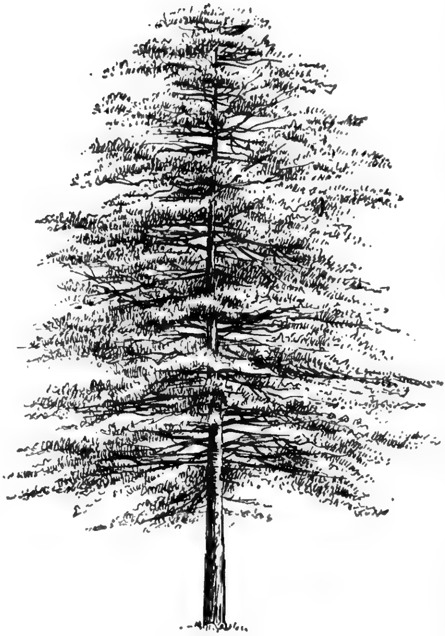
Pìnus Stròbus.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Conical; branches, whorled horizontally.*	80-175 *feet.*	*Northward to Great Lakes, southward to Georgia and Iowa.*	*June.* *Fruit: Sept.*

Bark: light greenish grey; smooth on young trunks and branches, and becoming rough and brownish with age. *Leaves:* three to five inches long; simple; arranged closely along the branches in clusters of five, and having short sheaths which fall early; needle-shaped; three-sided; light green; soft; delicate; glaucous. *Cones:* reddish brown; four to six inches long; terminal; solitary; drooping; cylindrical; slightly curved; resinous. *Scales:* thin; blunt. *Seeds:* winged.

The fragrance of balsam, the greenness of hope seem to come to us with the very name of a pine; but there are few among them that can claim as much admiration as the white pine. Much of the peculiar charm which distinguishes our scenery from that of other lands is owing to its great whorled branches which regularly stand out against the sky. Throughout the winter how magnificent is this living creature of the forest, when it stretches out its arms to uphold the snow and ice that bend them without mercy to the ground. And how must it be thrilled with delight as it is touched with the soft air of spring which lovingly dries its needles by fanning them in its breezes. Then as the silver sheen of their undersides passes through the hazy blue tone of its green, Thoreau describes the effect as similar to that of cold flashes of electric light.

It is interesting to reflect that during the latter part of the XVIIth century all silver shillings and smaller coins that were struck in the colony of Massachusetts bore the device of a white pine. Also in 1772, a clause in extenuation to one in the charter of Massachusetts Bay read: "That after September 21,



Pìnus Stròbus.

1772, in New England, New York and New Jersey in America no person shall cut or destroy any white pine trees, not growing in any township or its bounds, without his Majesty's license." The name Weymouth pine was given to it in England, and was to commemorate Lord Weymouth.

To-day the tree is in danger of extermination from the axe, for it is the most valuable timber tree of Eastern America. Its light, soft and straight-grained wood is free from knots and nearly so from resin. It is easily worked and receives a high polish. For carpentry and various constructions it is much used. In low, fertile soil the tree grows, often forming large forests, and also in sandy places. It appears most conspicuous in groves of deciduous-leaved trees, and in parts of New England it now occupies extensive tracts of abandoned farm land.

HEMLOCK. (*Plate CXXII.*)

Tsùga Canadénsis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Conical; branches, horizontal, drooping.*	60-80-100 *feet.*	*New Brunswick westward to the Gt. Lakes and southward.*	*April, May.*

Bark: reddish or grey; scaly, and becoming more rough and furrowed with age. *Leaves:* linear; half an inch long; simple; growing flatly on little petioles, singly, and opposite to each other up and down the branchlets; narrow; blunt at the apex and sometimes minutely toothed. When young light

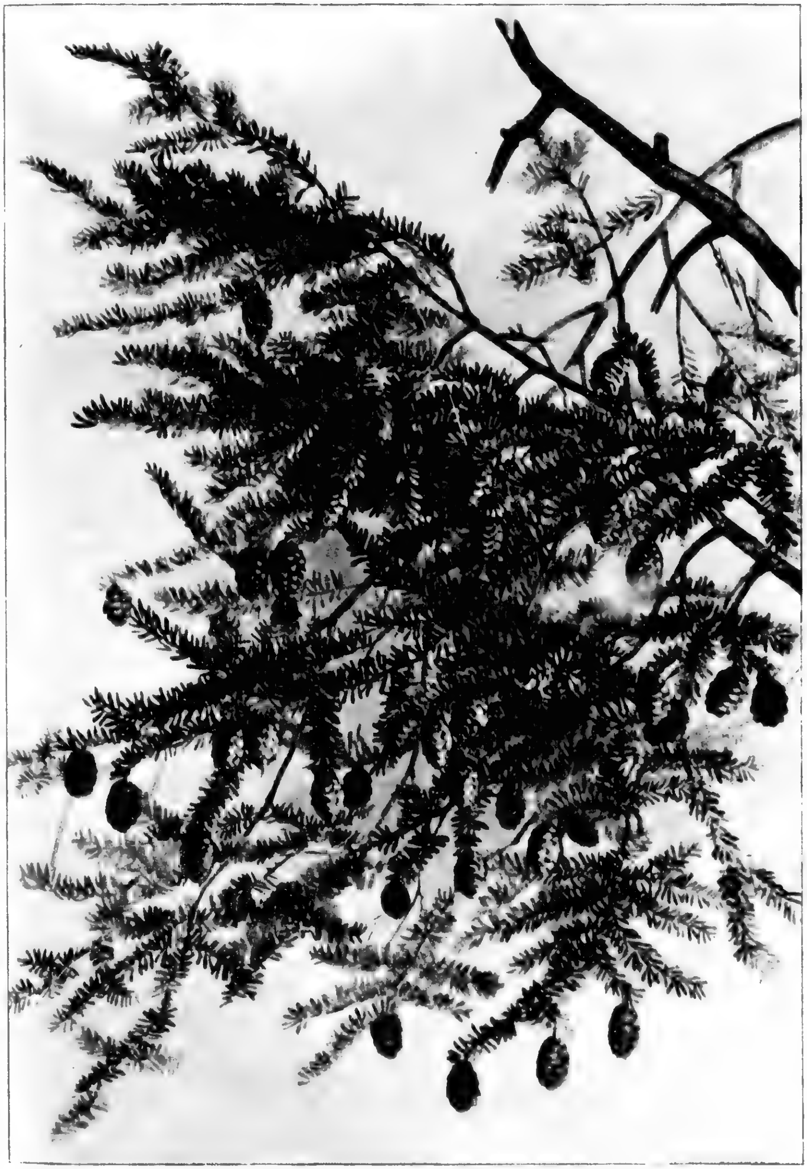


PLATE CXXII. HEMLOCK. *Tsuga Canadensis.*

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yellow-green above, becoming darker; lustrous; silvery white underneath. *Cones:* very small; hardly over half an inch long; ovate-oblong; solitary and drooping at the ends of the branchlets. *Scales:* rounded; thin; and not opening widely when the seeds are ripe. Seeds and wings nearly as long as the scales.

When on some open, rocky ridge this tree is seen growing by itself, it is often clothed to the ground with its graceful and drooping branches. Their spray is filmy and plume-like, and as first the intense lustre of their dark-green needles is heightened and as then their silvery undersides dart upward, it appears as though a light, fleecy cloud were gambolling through its boughs. When the spring-time comes the tree is touched with a lively yellow-green and is then, as also when it is young, one of the most charming sights of nature. In October, in the forest's shade it becomes dark, almost black, and stretches itself solemnly to its utmost height.

The hemlock has been much planted as an ornamental tree and has in cultivation produced new varieties, but none of them is so free and graceful in its growth as the wild tree. More often than for its timber, which is coarsely grained and brittle, it is felled for the sake of its bark. From this tannin is largely taken to be used in the manufacture of leather, and it is also known to possess medicinal properties.

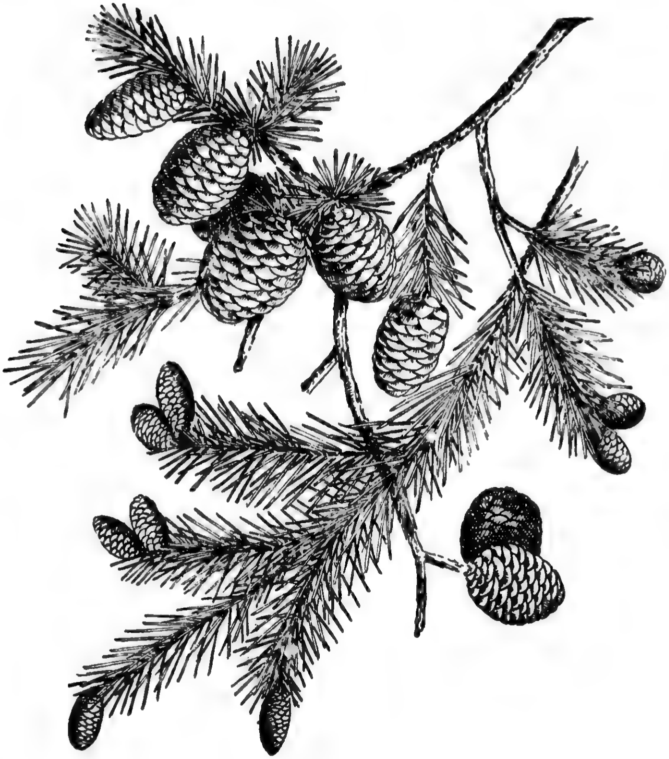
T. Caroliniàna, Carolina hemlock, is also of all the evergreen trees one of the most beautiful, and even in this point excels a little the common hemlock which it so closely resembles. In its habit of growth it is more dense, and the cones it bears are slightly larger with scales that are prone to diverge. The tree is not common and is generally found in groves along the high bluffs of the Blue Ridge mountains—that part of the country so rich in flora and forestry.

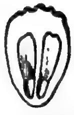
BLACK SPRUCE. (*Plate CXXIII.*)

Pìcea Mariàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Trunk, straight: lower branches, drooping.*	30-90-100 *feet.*	*North Carolina northward.*	*March-June.*

Bark: greyish brown; slightly rough. *Branchlets:* brown; greenish when young and pubescent. *Leaves:* seldom over two-thirds of an inch long; dark





Scale of cone, showing seeds.

PLATE CXXIII. BLACK SPRUCE. *Picea Mariana.*

blue-green; simple; growing thickly all along and on every side of the tan coloured twigs; needle-shaped; four-sided; curved or straight; rigid. *Cones:* one-half to one and a half inches long; rich purple, and turning later to reddish brown or tan colour; ovate or ovoid; terminal; solitary, and drooping at the ends of the branches; often persistent for many years. *Scales:* rounded; persistent; thin, and becoming wavy toothed at the apex.

To speak definitely of the outlines of trees is often difficult, for they adapt themselves with wonderful facility to the various conditions under which they grow. The black spruce when it inhabits dense thickets sends up a tall and slender shaft, quite free from branches until near its top ; but when growing in an open swamp with plenty of room for a free development it is often clothed to the ground with vigourous boughs. It then is very beautiful. After its youth has passed, however, and especially in cultivation it becomes scraggly and rough looking. Only when the tree is surrounded by abundant moisture does it thrive well, and near the coasts of southern New England, New York and New Jersey, it occupies many small swamps and bogs. From those of the red spruce its leaves are readily distinguished for they are shorter and of a bluer tint of green.

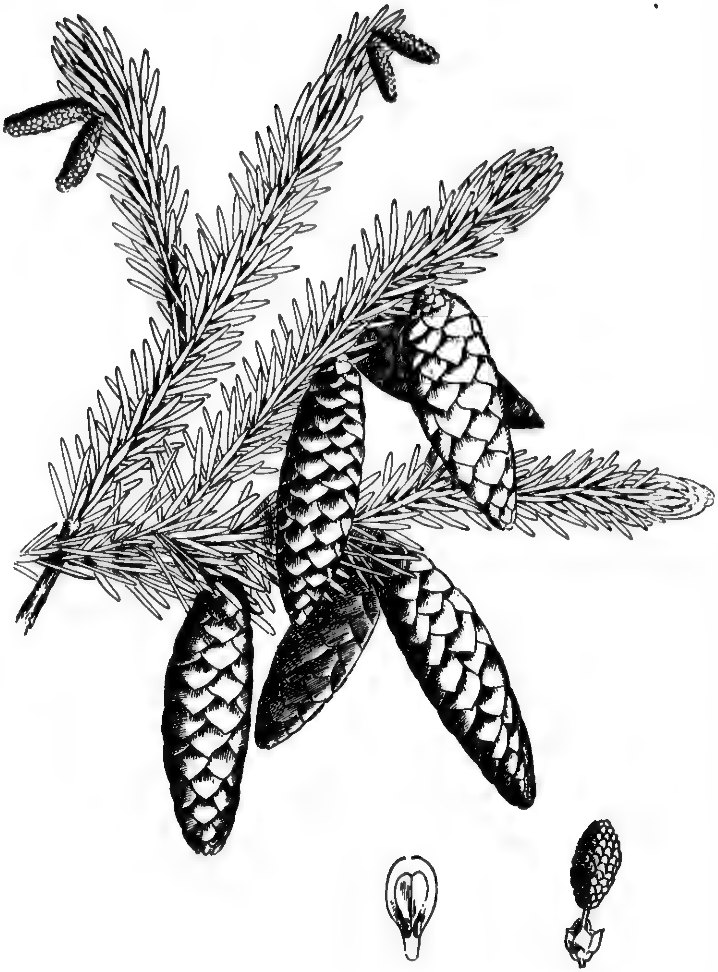
The timber produced by the black spruce is valuable and used among other purposes for the masts and spars of ships. It is pale red or white, straightly grained, and is marked with rather ornamental small knots. From the northern Indians it was that Europeans first learned to boil its young twigs with honey, and to extract the essence of spruce which is employed in making beer of that name.

WHITE SPRUCE. (*Plate CXXIV.*)

Pìcea Canadènsis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Cone-shaped, slender.*	30-100-150 *feet.*	*Maine and north west to Minnesota.*	*April, May.*

Bark: brown; scaly. *Twigs:* light buff; smooth. *Leaves:* light olive-green; simple; growing closely and singly from all sides of the branches; needle-shaped; four-sided; slender; slightly curved and sharply pointed on the sterile branches; more blunt on those that are fertile; glaucous. *Staminate flowers:* pale red. *Cones:* one to two inches long; pale green and turning later to light brown or tan colour; solitary; drooping; terminal at the ends of



Scale of cone. *Staminate flower.*

PLATE CXXIV. WHITE SPRUCE. *Picea Canadensis.*

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the branchlets. Oval, or cylindrical; very soft to the touch and falling at the end of the year. *Scales:* broadly obovate; rounded or two-lobed at the apex; entire.

As the tall shaft of the white spruce raises itself above the level of surrounding things and spreads its branches until they form a cone-shaped outline, it stands distinct and clear against the monotonous skyline. Nature shows us many little differences : nothing to her is insignificant. We notice therefore that the needles of the spruces have fine and sharp points and that they are arranged all about and on every side of the little branchlets. The fir trees have blunt-pointed needles, and the under sides of their twigs are not covered by them. That this tree may not be confused with the black spruce, its bark and foliage are both lighter in colouring ; and the scales of its cones are thinner and more papery to the touch than either those of the black or red spruce. (Pages 227 and 258). Of its clear, exquisitely white or faint yellow wood the best specimens have been compared to satin-wood. It is much used for fine interior finish.

BALSAM FIR. BALM OF GILEAD FIR. (*Plate CXXV.*)

Abiès balsámea.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Pyramidal; branches, horizontal.*	20-60 *feet.*	*Northward to Minn. southward to W. Va.*	*April, May.*

Bark: grey; smooth and horizontally marked as though with blisters. Little branchlets growing at an angle of forty-five degrees to the larger ones. *Leaves:* one-half or barely an inch long; simple; growing singly and flatly along the branchlets; needle-shaped; notched or blunt at the apex; very flat; straight; grooved above and having a raised ridge below; dark blue-green above; silvery bluish white below ; evergreen. *Odour:* aromatic. *Cones:* small; from two to hardly four inches long; violet colour when young, becoming light brown; growing erectly on the upper sides of the branches. *Scales:* broadly rounded; flat and thin; opening and falling when the seeds are ripe. The inner bract of the scales tipped with a bristle. *Seeds:* resinous.

Here we have the Christmas tree, the one most often chosen from the forest to be the central figure of gay and human scenes. But who that has read Anderson's story, "Der Tannenbaum," can help sympathising with the little stranger as it stands alone amid its new and untried surroundings? Although it had ardently longed to grow and to leave the quietude of the forest, that it might see something of the world without; it had been hurt by the axeman, and it found almost stifling the air of the brilliantly-lighted room. It bled at its base and suffered.

Abiès balsàmea.

Even in cultivation the tree is short-lived. It is the one, it is well to remember, from which the needles should be gathered to fill pillows.

From the blister-like portions of its bark, balsam is abundantly procured, and the air laden with its odours is known to have certain beneficial qualities, especially when breathed by those that have pulmonary diseases.

A. Fraseri, Fraser's balsam fir, is a beautiful rare tree which grows among the higher Alleghany mountains. It is very like the preceding species. In general tone it is olive-green although the under side of the needles is bluish white, and running through their middle is a line of bright green. The needles are very blunt-pointed and grow thickly on the upper side of the little branchlets. The cones are small and oblong, and the inner leaflet, or bract of the scales, projects a short and reflexed point.

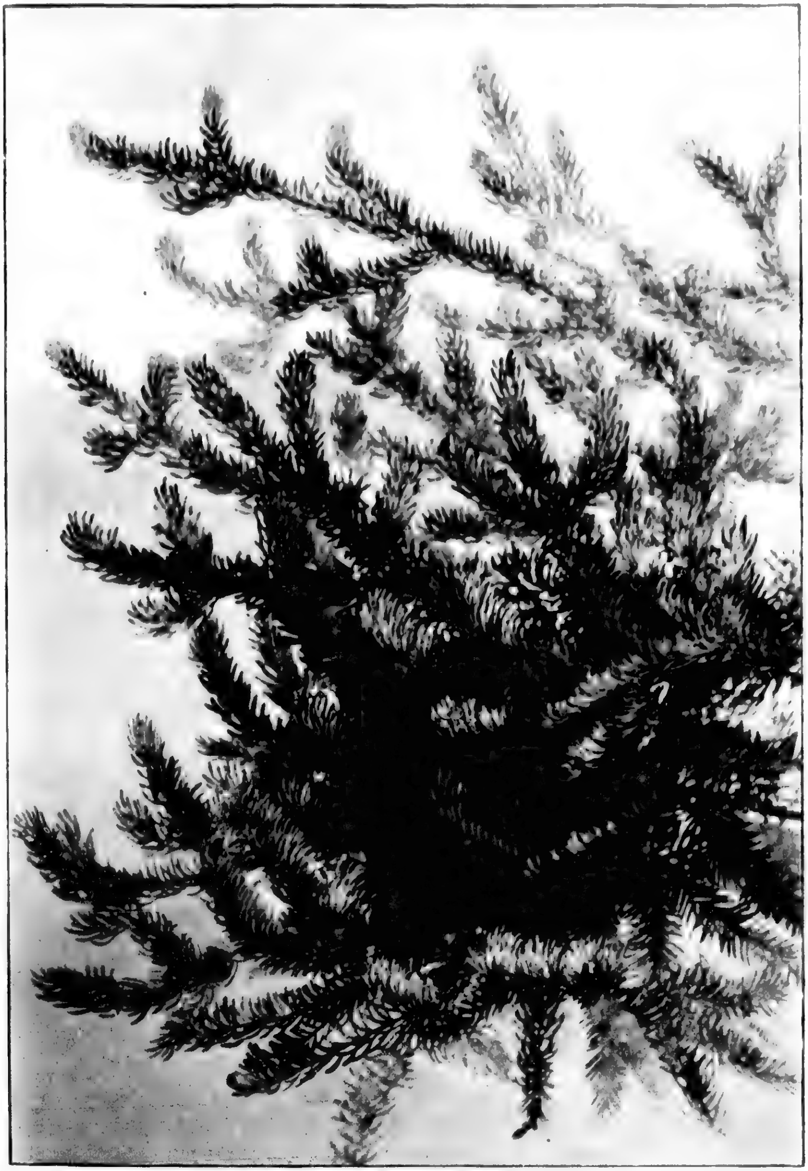

PLATE CXXV. BALSAM FIR. *Abies balsamea.*

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Trees Preferring to Grow in Sandy or Rocky Soil: Hillsides and Barrens.

"*Father, thy hand*
Hath reared these venerable columns, thou
Didst weave this verdant roof. Thou didst look down
Upon the naked earth, and, forthwith, rose
All these fair ranks of trees. They, in thy sun,
Budded, and shook their green leaves in thy breeze,
And shot towards heaven. The century-living crow
Whose birth was in their tops, grew old and died
Among their branches, till at last, they stood,
As now they stand, massy, and tall, and dark,
Fit shrine for humble worshipper to hold
Communion with his maker."
A Forest Hymn.—BRYANT.

PERSIMMON. DATE-PLUM. (*Plate CXXVI.*)

Diospỳros Virginiàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Ebony.	*Round-topped; branches, spreading or pendulous.*	20-60 *feet or higher.*	*Rhode Island southward to Fla. and westward to Illinois.*	*May, June. Fruit: Sept.-Nov.*

Bark: almost black or tinged with red; rough and divided into plates; astringent. *Leaves:* three to five inches long; simple; alternate; with short, pubescent petioles; broadly-lanceolate or oval, with pointed apex and pointed, rounded or cordate base; dark green and lustrous above, pale and dull underneath; thick; the whole leaf bordered with a delicate fringe, and pubescent when young. *Flowers:* small; greenish yellow; the staminate ones mostly clustered, the pistillate ones, solitary; axillary. *Calyx:* four-parted. *Corolla:* bell-shaped; four-cleft. *Fruit:* globose; almost sessile; astringent when green; when ripe reddish orange or rusty brown; edible; sweet; clinging to the branches until the beginning of winter.

In the fresh, green days of its youth, the fruit of the persimmon has a very acrid taste, as those find that have been unable to curb their impatience and have allowed its prettiness to tempt them to "try and see." But as it grows older, perhaps knows life better, and has been mellowed and turned to a rich, reddish orange or brown by the unrelenting touch of Jack Frost, it becomes sweet and agreeable. It is also not until after the tree is a hundred years old that it develops its heart-wood. Then it is nearly black, very firm and hard. From it shuttles and shoe lasts are made. In fact, almost all the parts of the tree are useful, as was well known by the Indians. They, in some way, dried its fruit and afterwards made it into beer. Combined with hops it is still brewed into domestic beer, and it is manufactured into brandy. Tannin is also found in the fruit which is possessed of a colouring matter, serviceable in making indelible ink. The seeds have been roasted as a substitute for coffee. From the bitter bark a strengthening tonic is produced.

Diospýros Virginiàna.

Throughout the southern part of the Atlantic and Gulf states the tree is very common, and many of them are often found growing thickly together in a shrubby form. The Duke of Argyle presented a persimmon tree to George the Third, and it is said to be still contentedly growing in the old aboretum at Kew.

CALIFORNIA MAHOGANY. (*Plate CXXVII.*)

Rhus integrifòlia.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Sum	*Low, spreading.*	10-30 *feet, or* 1-2 *feet.*	*Coast of California.*	*March, April.*

Bark: reddish or greyish brown; rough and ridged. *Leaves:* simple; alternate; with short, pubescent petioles; oval; rounded or pointed at the apex

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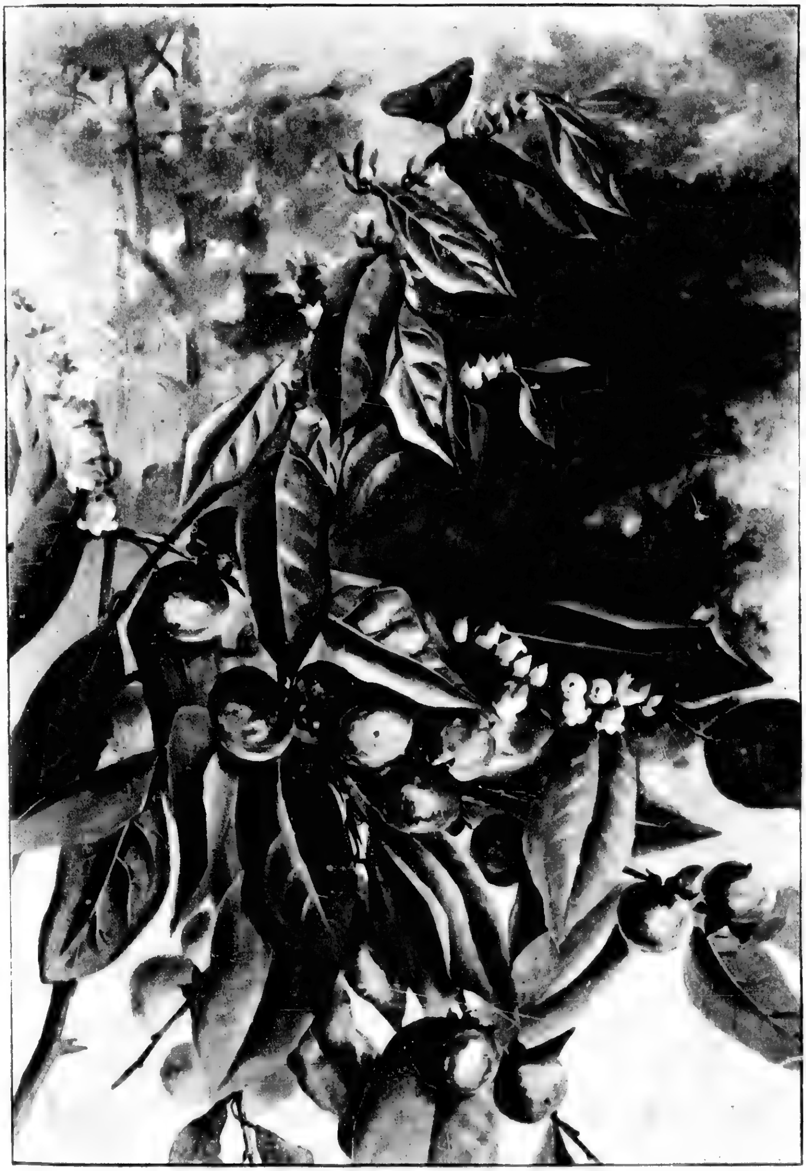

PLATE CXXVI. PERSIMMON. *Diospyros Virginiana.*

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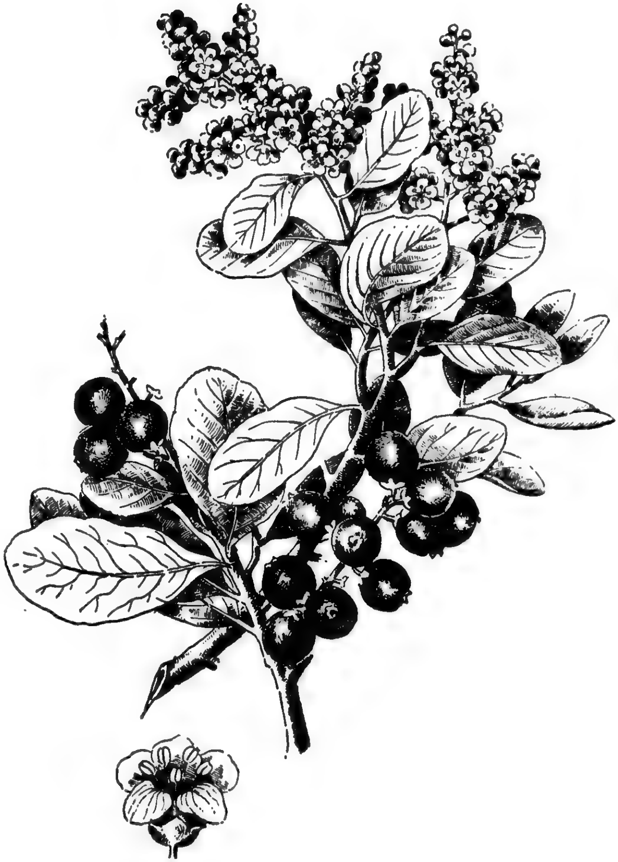


Staminate flower, enlarged.

PLATE CXXVII. CALIFORNIA MAHOGANY. *Rhus integrifolia.*

and rounded or tapering along the petiole at the base; entire or sometimes distantly toothed, when the sinuses are rounded, deep yellow, green above, paler beneath and glabrous, excepting along the veins and midrib; evergreen. *Flowers:* diœcious; small; growing in terminal, close racemes. *Sepals:* five; rose colour; fringed at the margin. *Petals:* five; rose colour; rounded; reflexed. *Stamens:* five, their filaments slender, with light coloured anthers. *Berries:* ovate; deep red and covered with a dark, sticky pubescence; their juice viscid and resinous.

About the clusters of tiny flowers of this shrub there is a flushed, rosy look as though they were blushing. Its fruit appears more assured and is of a deep, pure red which makes a fine effect among its leaves. The sticky substance with which the berries are covered renders them unpleasant to handle, and seems to warn one from eating them, especially when the rather unchristian-like characteristics of some of their relatives are remembered. Many cooling drinks, however, which are said to be excellent, are made from the oily substance that abundantly exudes from them.

Growing inland in the sandy, sterile soil about California, Rhus integrifolia is usually found as a small tree; but when it ventures to appear along the bluffs of the coast, it assumes a low, prostrate position, that it may better resist the tempests and high winds. For even greater protection, numbers of them are often found growing closely together. Its wood is a clear red and handsome. For fuel it is mostly used.

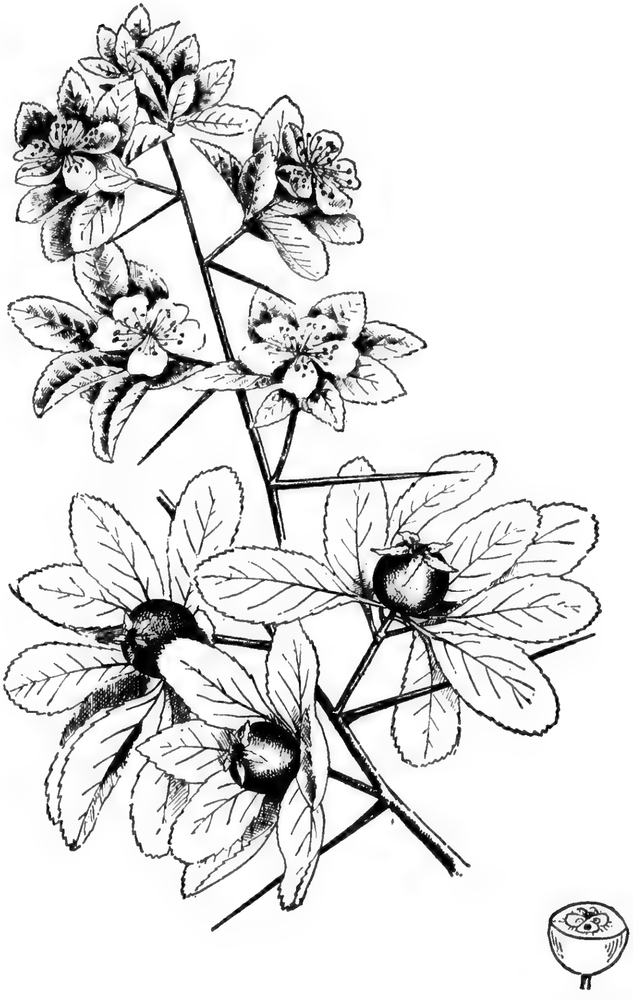
DWARF THORN. HAW. (*Plate CXXVIII.*)

Cratǽgus uniflòra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Bushy.*	3-8 *or* 12 *feet.*	*Southern New York southward.*	*May.* *Fruit: Oct.*

Bark: ash colour; furrowed. *Thorns:* numerous; nearly one to two inches long; slender; straight. *Leaves:* simple; alternate; almost sessile; spatulate-obovate, with rounded teeth and entire at the base; lustrous and glabrous above at maturity, pubescent underneath; thick. *Flowers:* white; usually one only, growing on a short peduncle at the end of the branchlets amid a cluster of leaves. *Calyx:* with five long points which equal the petals in length. *Corolla:* of five, rosaceous petals. *Stamens:* numerous. *Styles:* five. *Fruit:* yellowish; globular or pear-shaped; covered with hairs when young and containing five hard carpels.

Often in the sandy soil of abandoned fields and forest bor-



Fruit, laid open.

PLATE CXXVIII. DWARF THORN. *Cratægus uniflora.*

ders we find the dwarf thorn. Either in bloom or in fruit it is a pleasing, cheery sight, and it makes no secret of its family traits. The one delicate flower,—but rarely are two found,—that snuggles among the bright green leaves, or the solitary fruit, is an indication of its species, and it is also a shrub. Only along the banks of the Appalachicola River in Florida does it become arborescent.

It is always a gay time of the year when the hawthorns blow. The pageant of colour is then wending its way to its height of glory, and from the lowlands, the thickets and the swamps are seen the flowering trees and shrubs. Mountain sides are transformed into huge bouquets. The air is soft, and summer has come again.

AMERICAN ASPEN. WHITE POPLAR. QUAKING ASP.

(*Plate CXXIX.*)

Pópulus tremuloìdes.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Round-topped, symmetrical.*	20-80-100 *feet.*	*General.*	*April.*

Bark: nearly black at the base; rough and broken, and having brownish blotches under the branches. *Branchlets:* greenish white; smooth; bitter. *Leaves:* simple; alternate; with yellow petioles which are flattened sideways; broadly-ovate or semi-orbicular; rounded or abruptly pointed at the apex and cordate at the base; sharply and regularly serrate; dark green and lustrous above at maturity, yellowish green and glabrous underneath, but downy along the edges; when young covered with tomentum. *Ribs:* whitish or pale yellow. *Flowers:* diœcious; growing in drooping catkins and appearing before the leaves. The scales of the catkins silky, and having from three to five linear lobes.

The mythological legend concerning the poplars comes uppermost in the mind when watching the ceaselessly trembling leaves of this species.

After Phaeton had been hurled into the river Eridanus by the thunderbolts of Jupiter, for the peril he had caused by attempting to drive his father's chariot, his three sisters, the Heliades, greatly lamented. They ever sat by the river's edge and wrung their hands while their tears ceaselessly flowed. At last such sorrow touched the compassion of the gods, who

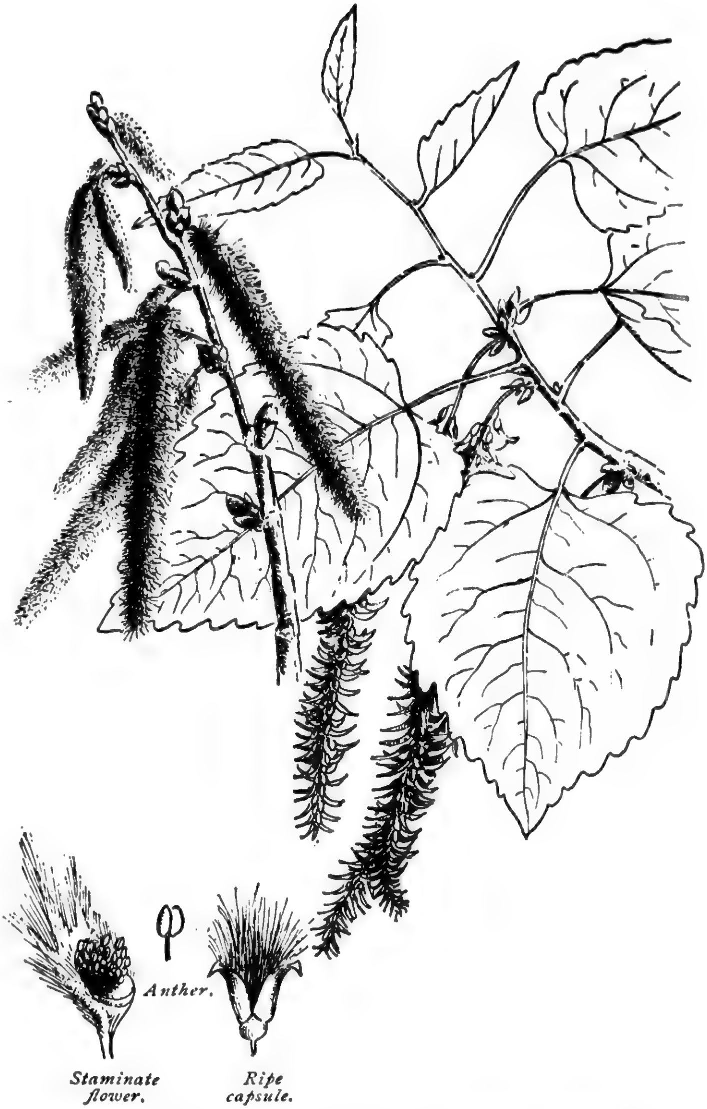

Staminate flower.
Anther.
Ripe capsule.

PLATE CXXIX. AMERICAN ASPEN. *Populus tremuloides.*

changed them into poplar trees and their tears into amber; for it was the belief of the ancients that amber flowed like tear-drops from the poplars.

The trees hardly suggest to us to-day such poignant grief. They are very gay and silvery when glistening and moving in the sunshine, and in the autumn they are fairly suffused with a golden glow.

The long hairs that surround the seeds of Populus tremuloides waft them to considerable distances from the plants by which they are borne. After they are deposited they germinate quickly and are well adapted to grow in soil that has been devoured by fire. On slopes of the Rocky mountains where immense tracts of land have thus been swept over and the coniferous trees destroyed, this tree has sprung up and covered the unsightly places with its stirring leaves. It also does good work in holding the soil of steep mountain sides together.

> "But here will sigh thine alder tree,
> And here thine aspen shiver;
> And here by thee will hum the bee,
> Forever and forever."
>
> —TENNYSON.

In the east the soft, light wood of Populus tremuloides is mostly converted into wood pulp with which to make paper or used as a substitute for rags. It is not strong or durable, but it is tough and when bruised rapidly closes its wounds. For this reason the ancients greatly desired it for bucklers. In early spring the northern Indians eat its sweet inner bark, and they use it for fuel. Even while green it burns freely.

LIVE OAK. (*Plate CXXX.*)

Quércus Virginiána.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Head, spreading, broad.*	40-60 *feet.*	*Virginia to Florida and Mexico.*	*March, April.* *Fruit: Sept., Oct.*

Bark: dark brown; deeply furrowed. *Branches:* grey. *Leaves:* simple; alternate; with petioles about a quarter of an inch long; ovate-lanceolate; with rounded apex and rounded or pointed base; entire, the edges inclined to

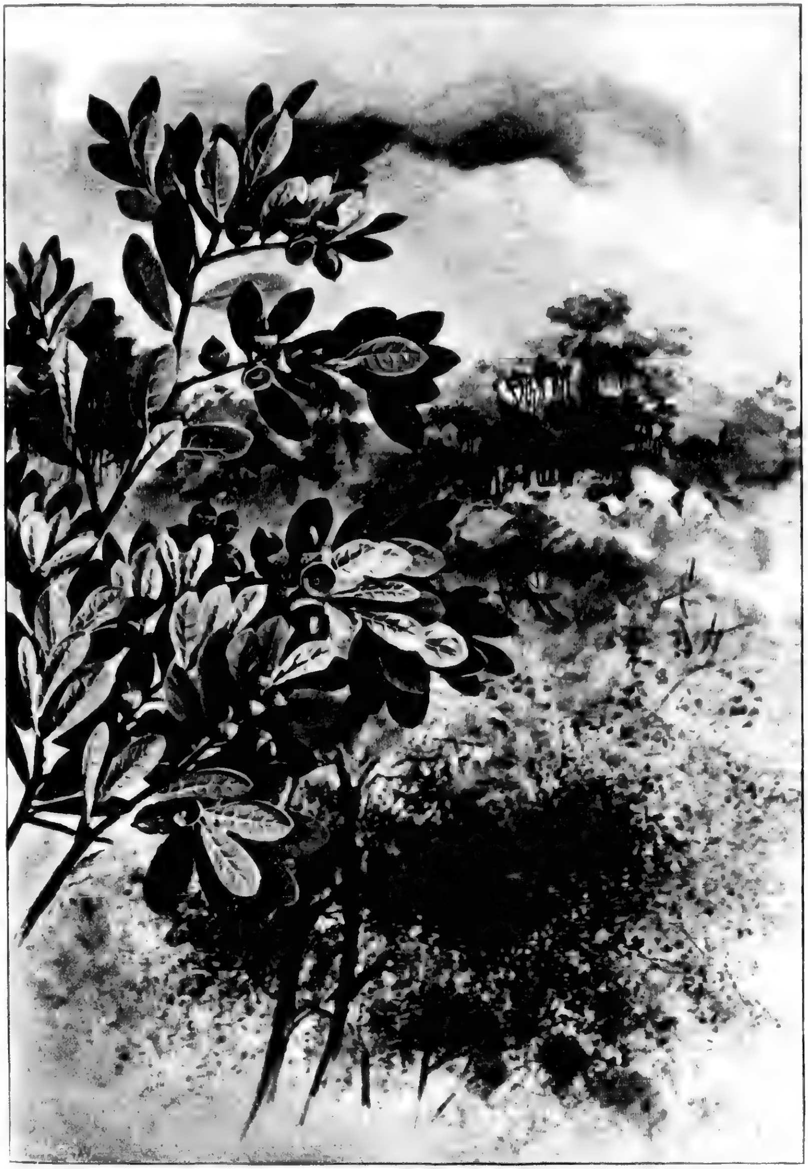


PLATE CXXX. LIVE OAK. *Quercus Virginiana.*

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curve inward. Occurring also in a spatulate form with minute side teeth towards the apex. Dark green and glossy above, lighter and pubescent underneath; thick; firm; evergreen. *Flowers:* appearing with the young leaves; the staminate ones growing in long axillary catkins. *Acorns:* growing on long stems. *Cup:* grey, or light brown; deep; pointed at the base and covered with closely compressed, fine and downy scales; slightly fringed about the top. *Nut;* dark brown; oval; lustrous, smooth.

When twilight is gathering its dimness these oaks cast broad shadows upon the earth, and those that have never seen their great forms in the south hung with the swaying Tillandsia can hardly conceive of the mystical effect they then produce. About their small evergreen leaves there seems to be a firmness of purpose, and the whole appearance of the trees is vigourous and powerful.

Quércus Virginiàna.

Of the fifty species of oaks that are indigenous to America none is more interesting than Quercus Virginiana. A small spray of its foliage, such as is illustrated in the coloured plate, bears hardly any resemblance to that of the red, the scarlet, the white or many of the other oaks so familiar in the north-eastern part of America. It rather suggests the willow oak, with which the tree is often found growing. The acorns of the live oak are small and among the quaintest of the family.

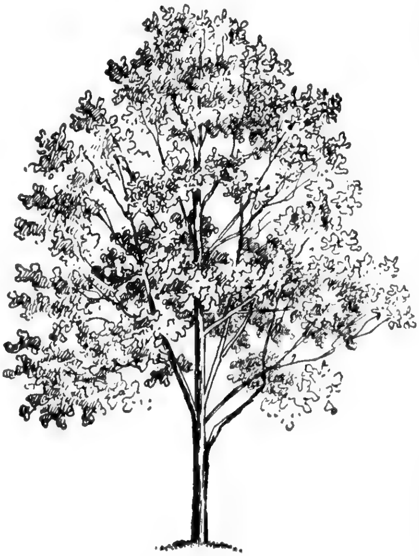
Quercus Virginiana produces timber which is rather difficult to work, but it is strong and compact and receives readily a high polish. It is much used in ship building. The bark of the tree contains considerable tannin.

SPANISH OAK. (*Plate CXXXI.*)

Quércus digitàta.

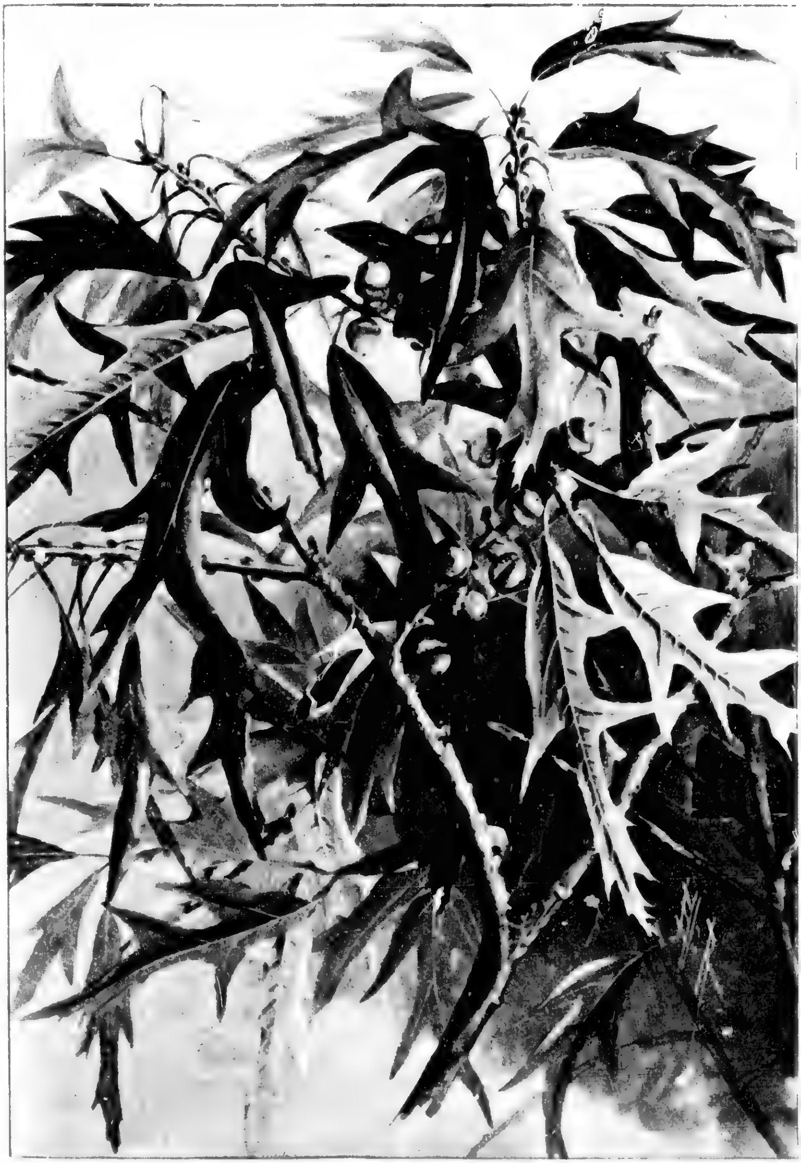
FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Round-topped: branches, spreading.*	20-30 *or* 80 *feet.*	*N. J. southward and westward.*	*May, June. Fruit: Sept., Oct.*

Bark: brownish red or almost black; rough and broadly-winged. *Leaves:* simple; alternate; obovate or oblong, widening towards the middle and forming from three to seven long, slender lobes; the terminal one somewhat scythe-shaped; entire or sparingly toothed and bristle tipped; the base wedge-shaped or rounded, frequently one-sided. Dark green and glabrous above, rusty grey and pubescent underneath. *Acorns:* small; almost sessile. *Cup:* shallow. *Nut:* rounded and slightly hollowed at the apex. *Kernel:* bitter.



Quércus digitàta.

It is not difficult to recognise the Spanish oak although its leaves are very variable and often occur on separate trees or even on branches of the same tree in two distinct forms. They are always downy underneath. Glancing upward through one of these trees, when its foliage is beginning to dry and fall in the autumn, it will be noticed to have a more sharply cut and angular look than that of any other of the oaks. The effect is owing to its deeply incised and slender lobes. Soil and climatic conditions greatly influence the tree's growth. In the northern Atlantic states it is not common, and it clings to the coast. In southern New Jersey, where it is more frequent, it chooses gravelly places and barrens for its habitat; but it does not then attain the stately and slender height that it does southward. It there grows in swamps, often side by side with



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the swamp white oak, and its bark is pale and scaly. Its acorns are among those that require two years in which to ripen.

The reddish brown wood of the Spanish oak, although strong, is not regarded as being of any especial value excepting for fuel. Its bark contains tannin and properties which are of value medicinally.

SCARLET OAK. (*Plate CXXXII.*)

Quércus coccínea.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Head, narrow, open.*	50-90 *feet or higher.*	*New England southward and westward.*	*May, June.* *Fruit: Sept., Oct.*

Bark: greyish brown; rough. *Inner bark:* reddish. *Leaves:* large; simple; alternate; slender-petioled; broadly oval; often squared at the base and having from five to nine lobes, which frequently extend to within half an inch of the midrib; toothed and bristle-tipped at their ends; sinuses, broadly rounded. Bright green and lustrous above, lighter beneath, with slender, yellow midrib; glabrous. *Flowers:* monœcious; yellowish green; the staminate ones growing in slender catkins, the pistillate ones, bright red and clustered on pubescent peduncles. *Acorns:* sessile or growing on peduncles; quite large. *Cup:* scaly, with conical base. *Nut:* one-half to three-quarters of an inch long; rounded. *Kernel:* white; bitter.

All minor characteristics of the scarlet oak seem to be immersed in the brilliant bright red of its autumn foliage, the most exquisite tint displayed by any one of the family. But those that have watched its unfolding leaves in the spring know that they too were red when they first peeped shyly out at the world, and it therefore does not seem strange that when they are about to die they should return to their early convictions. The tree at all times is a charmingly gay feature of the landscape and when seen must ever surpass the accounts that have been written about it. In sandy or light, dry soil it grows, often beside the black oak, and it is much seen and desired in cultivation.

The custom of the oak family is for its pistillate flowers to grow in an involucre that appears like a bud, and it is this involucre which later becomes the cup, or cupule. When the

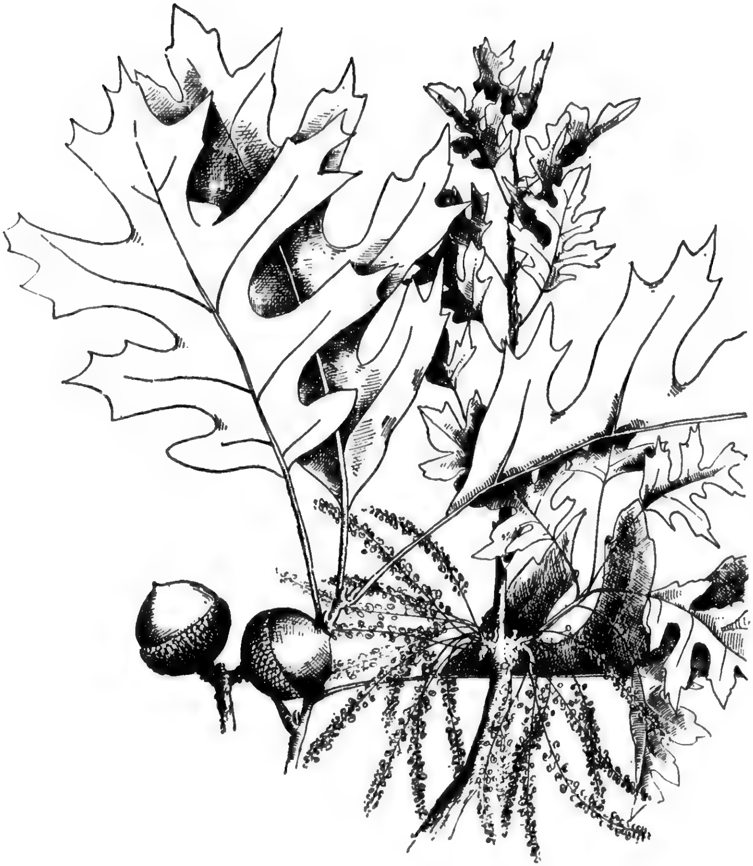
Sterile catkins.

PLATE CXXXII. SCARLET OAK. *Quercus coccinea.*

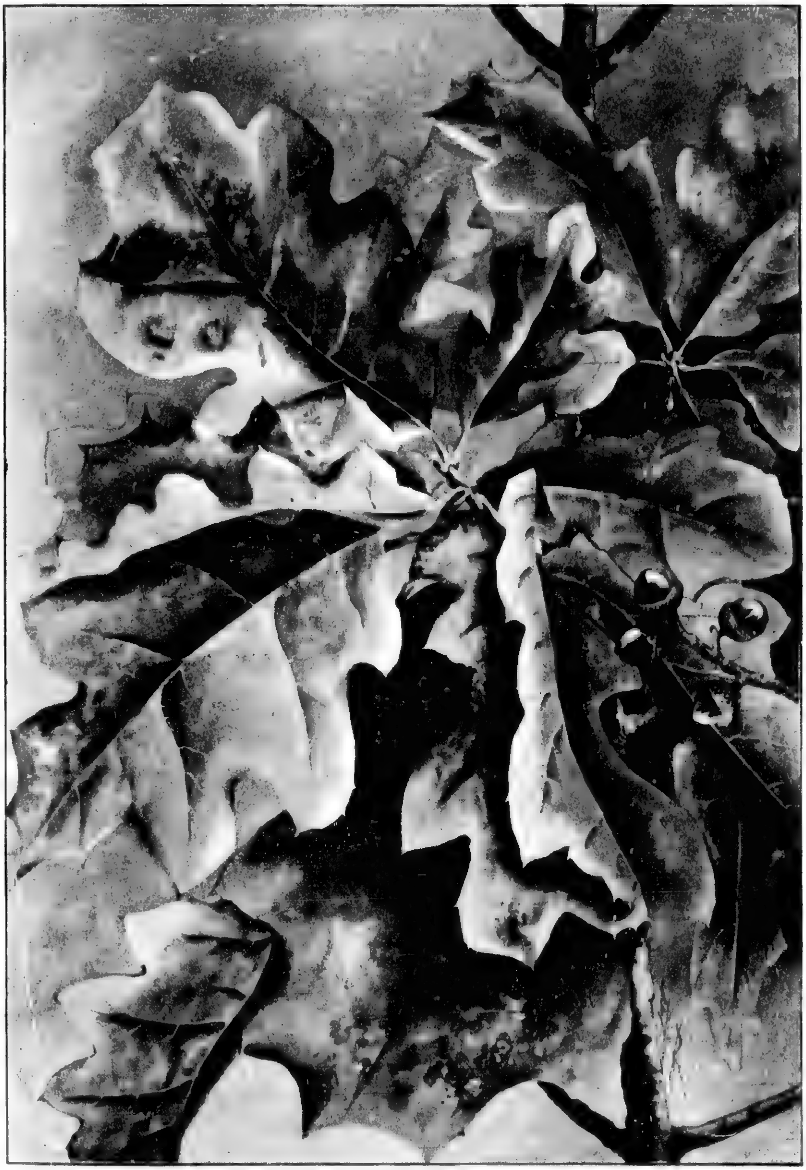

PLATE CXXXIII. BLACK OAK *Quercus velutina.*

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nut drops into the ground and begins to germinate it does not send up at once two cotyledons from the summit of its hypocotyl. They, in the husk, have become so thickened as to have lost their power of acting as leaves, and they occupy nearly the whole of the seed. Instead, therefore, of growing themselves, they supply to the plumule, or little bud which lies between them, an abundance of nourishment. For this reason when it sends up the first joint of its stem, the first leaves that appear on it are imperfect, often little more than scales. The true cotyledons have remained below. (*Plate VI.*).

BLACK OAK. QUERCITRON. YELLOW-BARK OAK.

(*Plate CXXXIII.*)

Quércus velutìna.

Between the black oak and the scarlet oak there are certain differences in colour which may aid many to distinguish them. It is true that at times they are dissimilar in leafage, but again the black oak is so very variable that some of its forms are nearly identical with those of *Quercus coccinea.*

The kernel of its nut is bright yellow and smaller than that of the scarlet oak, which is white. But unfortunately the acorns mature in September and October only, so during the early part of the summer we must seek out some other unchanging difference between them. Again we are aided by colour. The bark of the black oak is a dark brown, or nearly black, and it is broken into close scales. A still more poignant difference is that its inner bark is deep orange, never reddish or grey. In the spring its leaves are red, and they turn when the tree blooms to a silvery green. They are rich red or russet in hue in the autumn and quite without the vivid touch of colour which is the chief charm of the scarlet oak.

The tree grows with a narrow, open head to a height of from seventy to eighty or even a hundred feet. It is never as stately as the red oak. In the coloured plate the leaves are represented in their broadest form. As they then appear and after they have lost their bristles, which they often do at maturity, they have a blunt and pronounced expression quite at variance with that of their narrower forms. Although generally pubescent underneath, the leaves become smoother as they grow old. In gravelly uplands the tree is found, and from Maine southward to Florida and westward.

Quercitron, a well-known dye, is extracted from the bark of the black oak which is also valuable because of its abundant yield of tannin. A substance is besides taken from it that has considerable efficacy when used for external applications.

LABRADOR PINE. GREY PINE. NORTHERN SCRUB PINE. BANK'S PINE. (*Plate CXXXIV.*)

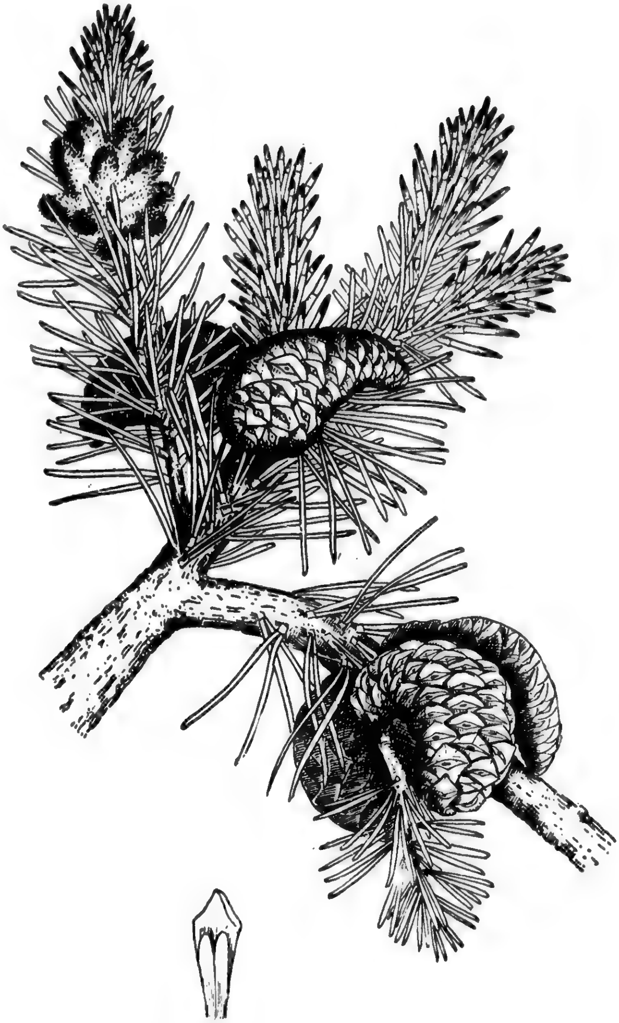
Pìnus dìvaricàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Head, open; branches, long, straggly.*	40-80-100 *feet.*	*Southward to Maine and New York, westward to Illinois.*	*May, June.*

Bark: dark brown; irregularly ridged and flaky when old. *Twigs:* reddish. *Leaves:* one inch long; greyish green; simple; growing closely crowded along the branches in bunches of two with sheaths at their bases and diverging widely; needle-shaped; pointed at the apex; grooved above and curved; rigid; evergreen. *Cones:* about two inches long; numerous; oblong-conical; growing usually in pairs and curving upward in the direction of the branches; thick. *Scales:* blunt; thickened at the apex and tipped when young with a spine; glabrous.

About the great there is simplicity, and somehow we are sensible of this when we stand before these grave inhabitants of the forests, the pines. They have lived long on the globe. In fact, the coniferous trees knew the world in one of its earliest geological ages, the Age of Reptiles. Flying things were then not developed, but it mattered little to them. The wind was already old and in spite of its extravagance served well to distribute their pollen. From its aid they have never departed in favour of the gay, gauzy and prudent insect messengers of a later time. This is not true, however, of all trees.

It is interesting to notice the extreme simplicity of the or-



Scale of cone.

PLATE CXXXIV. LABRADOR PINE. *Pinus divaricata.*

gans by which these great beings reproduce themselves. The fertile flowers of the pines proper grow in scaly catkins which later develop into cones. Their pistils are not, as ordinarily, leaves rolled together so as to form closed pods. They are always open, scale-like leaves which bear on their inner surfaces, near the base, two or more ovules. About the woody axis of the cone they grow in a spiral fashion, subtended by the woody cone-scales. When the pollen is falling from the stamens these pistil leaves of the young cone are ready to receive it, that it may fall directly upon the exposed ovules. As it slips in between the opening scales it is caught by a tiny drop of fluid which exudes from the coat of the ovule. When the fluid is then absorbed, the little grain comes closely in contact with the ovule's surface. As soon as this is accomplished the cone-scales close tightly over each other to protect the forming seeds, and not until they are ripe do they again diverge and assume a drooping position to allow of their escape. The sterile flowers also are simple, almost primitive in construction. They grow in long, close tufts at the ends of the branches, for both sorts of flowers are produced on the same tree. We may regard them as single stamens which have been reduced to a two-celled anther with hardly any filament. From them the pollen flies in golden clouds during the days of May. Each little grain is floated about by two bladder-like wings. They can be caught and examined under a microscope; for it only needs a quickened observation to see them abundantly lying about.

Pinus divaricata occurs both as a shrub and as a tree. It is not very beautiful, for its short needles give it a blunt, obtuse look. But its wood is much used for the making of charcoal. It is quite resinous. The Canadian Indians find it easy to work and often construct from it the frames of their canoes.

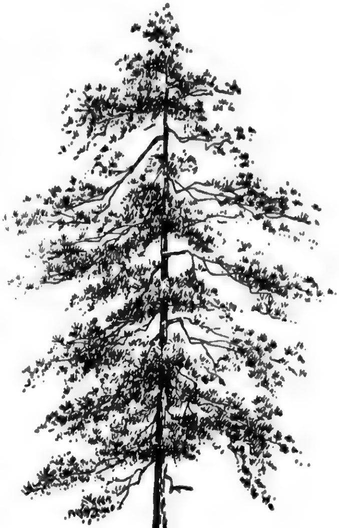
About the tree still clings some fetish idea, and in parts of the country, women, to whom it is especially supposed to work mischief, loudly declare that they would not pass within ten feet of it. The soil in which it grows is said to be poisoned by it, and thus it wreaks an indirect injury upon browsing cattle. The only way to dispel its supposed evil influence is to have it mysteriously burned down, as the superstitious dread of it is strong enough to preserve it from the axe.

CANADIAN PINE. RED PINE. (*Plate CXXXV.*)

Pìnus resinòsa.

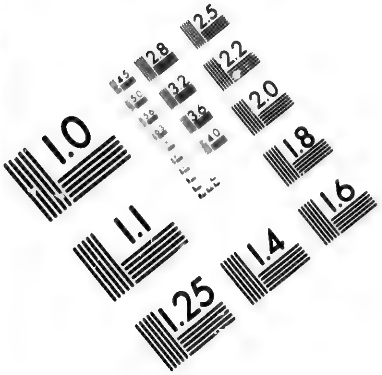
FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Pyramidal, irregular.*	50-90-150 *feet.*	*New Foundland and northward to Wisconsin.*	*May, June.*

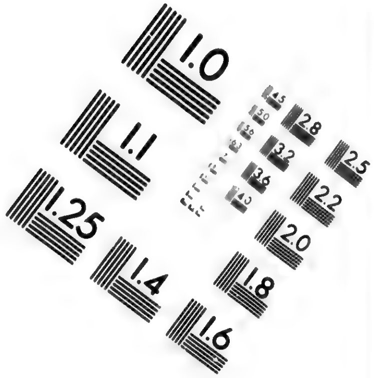
Bark: reddish brown; almost smooth; becoming scaly when old. *Branches:* red; smooth. *Leaves:* five to eight inches long; dark green simple; growing along the branches in bunches of two and having at their bases a long, persistent sheath; needle-shaped; rounded on the upper side, the lower one hollowed; supple; glabrous. *Cones:* two to three inches long; growing at the apex of the branches in crowded clusters; ovate-conical; glabrous. *Scales:* rounded at their bases; somewhat thickened and having no prickly points.



Pinus resinòsa.

It is to the clear, bright colour of the bark of its trunk that this species of pine owes its name of red pine, but its specific name is rather misleading. The tree is not nearly so rich in resin as many another. This resin which we find in the wood of coniferous trees plays an important part in their construction. With the oil of turpentine which is held in the tree, it forms a sticky substance well known as balsam. And balsam is the balm for all the pine tree's wounds. Wherever the trunk, the branches, or even the leaves have been bruised it exudes and adheres closely to the spot. By the action of the sun





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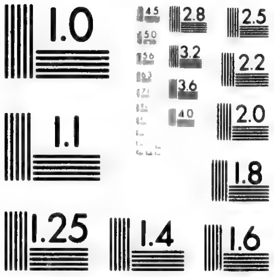

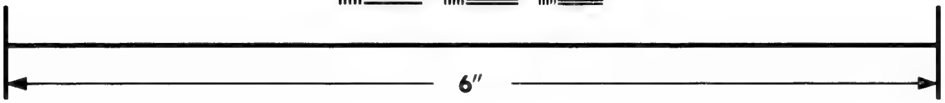

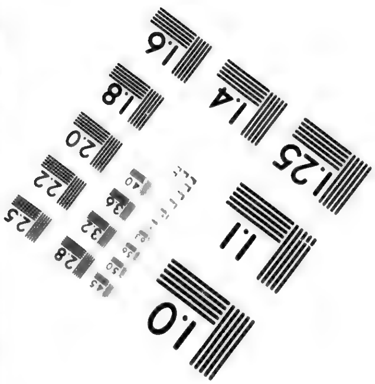

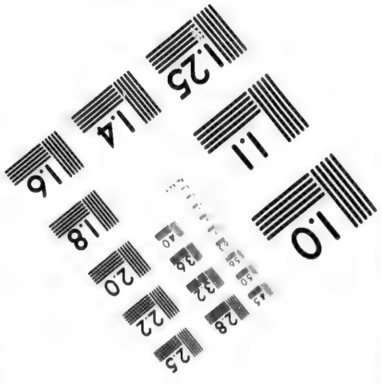

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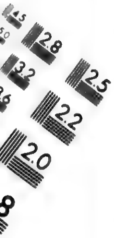
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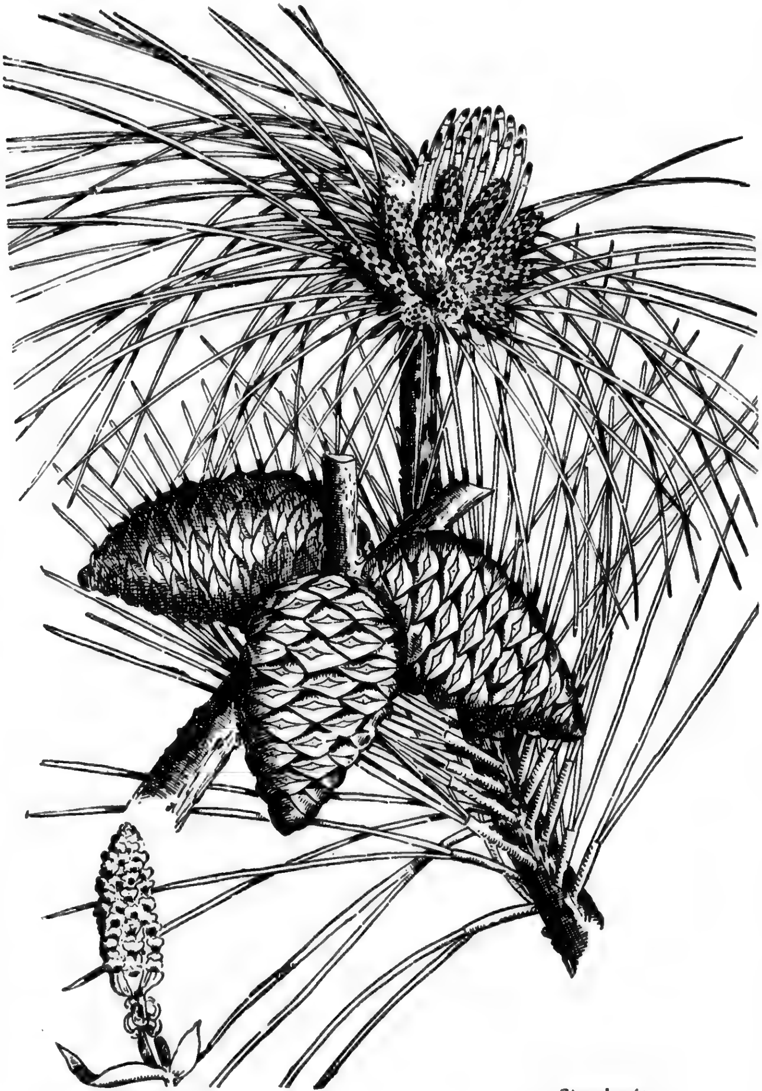

PLATE CXXXV. CANADIAN PINE. *Pinus resinosa.*

and the air it is then hardened into a soothing plaster which prevents the vital fluids from escaping. Through the aid of balsam therefore the tree is often saved from dying and is kept alive for a long time, even although it has been girdled. The heart-wood of many pines also never seems to grow old. When necessary it can resume the function of its youth and pilot the sap up to the leaves for nourishment.

The wood of the Canadian, or red pine, is pale red, hard and compact. Its grain is not nearly so beautiful as that of the yellow pine. For many purposes it is used, such as the construction of bridges, and it is largely exported from Canada to Great Britain. The bark contains tannin.

Although always a picturesque tree, it is in its youth that Pinus resinosa is most beautiful. Its long, supple needles then grow in clusters along the branches as well as in thick, soft tufts at their extremities. As the tree grows old the side needles fall away, and were it not for the end clusters it would look almost as though it were dead.

JERSEY PINE. SCRUB PINE. (*Plate CXXXVI.*)

Pìnus Virginiàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Pyramidal, irregular; branches, scraggly, drooping.*	15-40 *feet, or higher.*	*Eastern States to South Carolina and Indiana.*	*April, May.*

Bark: greyish brown or black; rough; flaky. *Branches:* smooth; the twigs purplish; glaucous. *Leaves:* from nearly one to three inches long; deep yellow-green; simple; growing closely along the branches in bunches of two and sheathed at their bases; when old spreading; needle-shaped; round and glabrous on the upper side, flat and rough below; slightly curved; stiff. *Cones:* from nearly two to three inches long; solitary; ovate-oblong and growing on short stalks. *Scales:* thin; thickened at the apex and tipped with a stiff, awl-shaped prickle; often cracked horizontally.

From the subtle but recognised lines of beauty this pine has indeed departed, and its reputation is that of not being handsome. But who shall say that its rugged, irregular growth does not present beauty in another than the conventional form? Surely in the regions where it grows no one stops to criticise it,

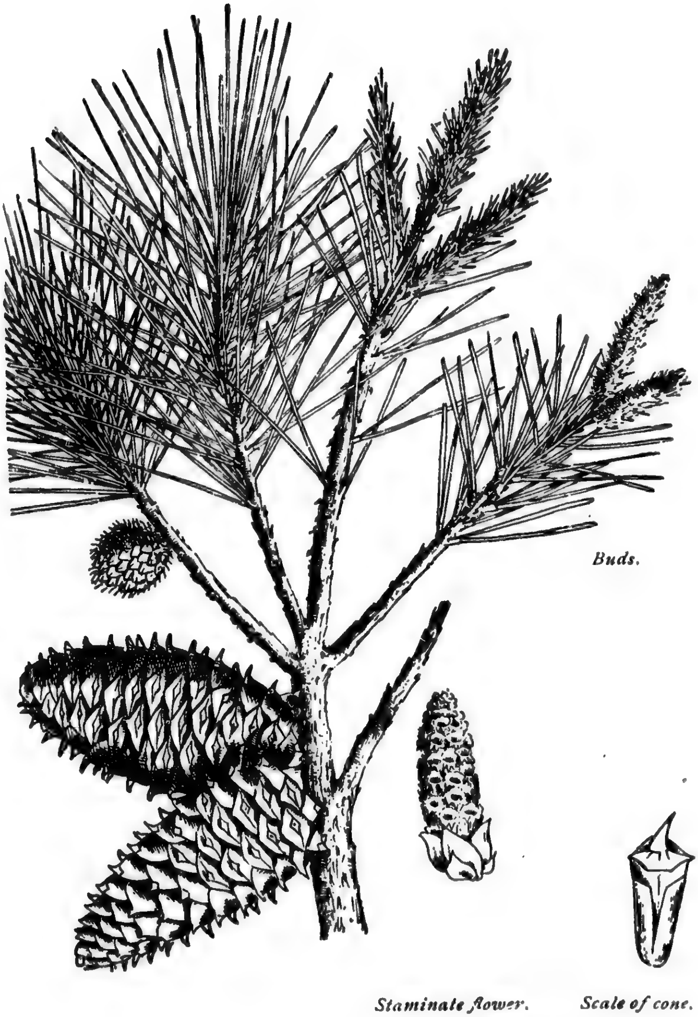
Buds.
Staminate flower.
Scale of cone.

PLATE CXXXVI. JERSEY PINE. *Pinus Virginiana.*

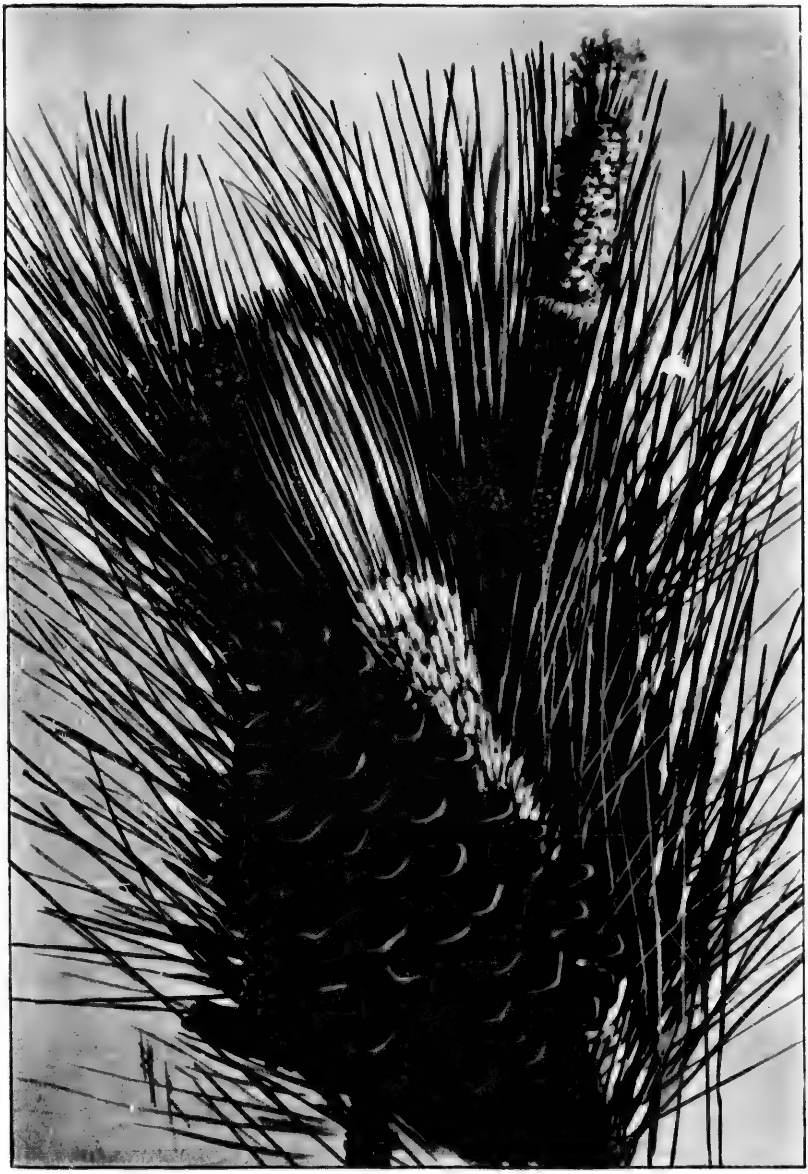

PLATE CXXXVII. LONG-LEAVED PINE. *Pinus palustris.*

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or to think that it is other than attractive. Over fields where the soil has been exhausted by succeeding crops it spreads itself rapidly and lends a sturdy, wholesome look to the landscape. Sometimes it forms dark forests. One of its strong points of individuality is that its branches are smooth ; those of other pines are usually scaly. In the Atlantic states it rarely grows to a great height.

The reddish-yellow wood of the Jersey pine is resinous and not very strong. It is brittle and pithy in substance, and for these reasons is of rather inferior value.

LONG-LEAVED PINE. SOUTHERN YELLOW PINE. GEORGIA PINE. (*Plate CXXXVII.*)

Pínus palústris.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Head, round, open; trunk, slender.*	70-80-120 *feet.*	*North Carolina southward to Texas.*	*March, April.*

Bark: orange-brown, separating into thin scaly plates. *Leaves :* ten to fifteen inches long; dark bluish green; simple; growing closely in bunches of three, and forming thick tufts at the ends of the branches; sheaths from one to one and a quarter inches long; slender; flexible. *Cones :* six to ten inches long; light brown; cylindrical; terminal; erect. *Scales :* thick, with small, blunt spines at their ends.

To those that have walked through the great forests formed by this tree and by, among others, the white cedars and live oaks, there must always cling a memory of the impression made by its masses of long, flexible needles and its beautiful cones. About it there is the same appearance of gravity and aloofness which characterises so many of the pines. It seems as though they were less playful, more reserved than the deciduous-leaved trees ; as though even Nature did not venture to dress and undress them just whenever she chose.

Of the pitch pines this great tree is the most valuable, and so extensively has its wood been utilized that the very name Georgia pine is suggestive of commerce. Viaducts, bridges, trestle-work and great quantities of railroad ties are made from it. Even its stumps are cut up and sold in bundles for kindling wood. The colour of the wood is a deep, rich orange, yellow or light red, and it is more ornamental than that furnished by any other of the pines. Its juices also are valuable, and supply the greater part of our turpentine, resin and tar. In the "turpentine country" of Georgia it is truly a pathetic sight to see these trees when girdled and bruised from the process of boxing. Their juices have then been drawn off and sent to be distilled. Even before the Revolution this making of turpentine was a large industry in this country. For many years the trees exist—it can hardly be called living—and sometimes a small tuft of green at their top is all that distinguishes them from those that are dead. Were it not for the long continued activity of their heart-wood and the healing salve of their balsam they would have necessarily succumbed. Through its extensive usefulness, however, the tree seems to be doomed by the axe. Even the young trees when they occur among objectionable undergrowth are set on fire that they may clear it away, and their ashes improve and fertilize the land. At Christmas time also in the south many fall every year for the decoration of houses and churches.

Pìnus palústris.

SHORT-LEAVED PINE. YELLOW PINE. SPRUCE PINE. BULL-PINE. (*Plate CXXXVIII.*)

Pìnus echinàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Pyramidal; branches, spreading, regular.*	40-120 *feet.*	*New York to Florida westward to Kansas.*	*May, June.*

Bark: greyish brown; rough; much broken into plates. *Branchlets:* green or purplish; stout; glaucous when young. *Leaves:* three to five inches long;

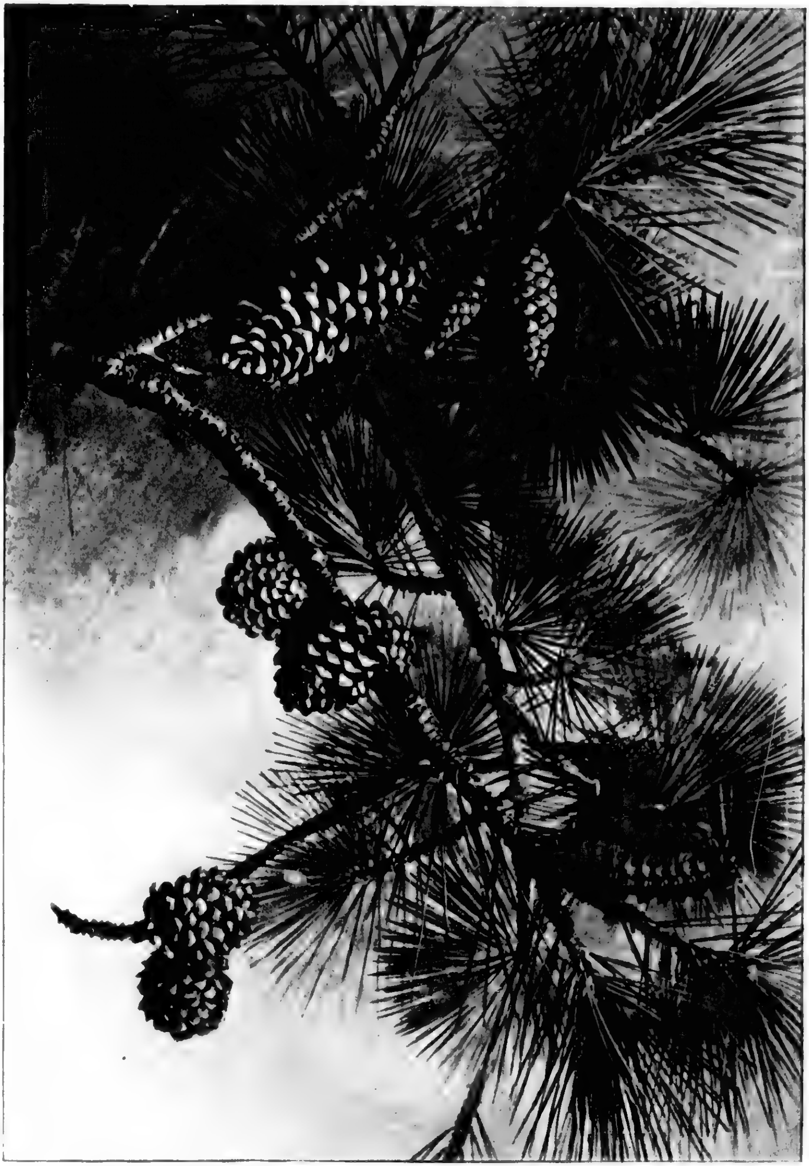

PLATE CXXXVIII. SHORT-LEAVED PINE. *Pinus echinata.*

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dark bluish green; simple; growing closely along the branches in bunches of two, or sometimes three on the young shoots, and having sheaths at their bases; diverging widely at maturity; needle-shaped; slender; dark green, and rounded on the outer side, hollowed on the inner one; soft; evergreen. *Cones:* one and a half to two inches long; ovate; solitary and lateral; rough and jagged as they grow older. *Scales:* thick at the apex, and tipped with a weak, projecting prickle which falls early.

Dark, but clear against the autumn sky, this handsome tree raises itself on the sandy hills, or in the flat meadows. It breathes a sense of sturdiness. Often we see its leaves so clothed with dust that the very life of their colouring appears to be gone; then they are washed by the rain, and their sombre brightness is restored. By the coloured illustration, which is very beautiful, the distinctive cones of the species are clearly represented. When they are old and lying useless upon the ground they are quite jagged and have a used-up expression.

The tree is rather generally distributed and seems to be getting in readiness to supply a new crop of valuable timber when that of *Pinus palustris*, long-leaved pine, from which its common name of short-leaved pine is used as a designation, shall be exhausted. In many ways the wood of the two trees is similar, although that of Pinus echinata can hardly boast as rich a colour. It has, however, the same beautiful lines. It is closely or coarsely grained and varies greatly in quality. It is only moderately resinous. For all kinds of building and carpentry it is of inestimable value. When used for fuel it emits a large amount of heat and burns with a lively, brilliant flame.

PITCH PINE. TORCH PINE. CANDLEWOOD PINE.

(*Plate CXXXIX.*)

Pinus rigida.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Head, open; branches, irregular; trunk, curving.*	30–80 *feet.*	*Eastern and Middle states; Ga. and Ky.*	*April, May.*

Bark: dark, tinged with purple or red; rough and deeply furrowed; separating into strips. *Leaves:* three to six inches long; dark yellow-green; simple; growing closely along the branches in bunches of three and having short sheaths at their bases; at maturity spreading; needle-shaped; flattened on the outer side, the inner one slightly ridged and rough; curved; rigid; sharp; evergreen. Under the microscope the surface can be seen to be marked with fine white dots. *Cones:* one and a half to three inches long; growing mostly in clusters of two or four; ovoid-conical; lateral. *Scales:* thickened at their apex and tipped with a stiff and sometimes recurved prickle.

How much the trees give to man; the life element of the air he breathes is only the beginning of their generosity, for they supply his wants as well. It seems as though they had a grand, stupid fondness for the whole animal world.

Pinus rigida.

The pitch pine is rough and scraggly in appearance, and its light, reddish-brown timber is coarse and of slight value. But its wood contains an immense quantity of pitch, and so it is desirable for fuel and for making charcoal. It is also rich in tar and turpentine. Through the pine barrens of Long Island and especially of New Jersey where it forms the bulk of "the pines" it is well known. It grows rapidly and can sustain itself in soil where many others would die from a lack of nourishment. Even when cut down numerous and vigourous shoots often spring up from its stump. Occasionally the tree inhabits cold, deep swamps. About Cape Cod and on Nantucket a most interesting and successful experiment has been made in sowing its seeds.

On February 27, 1855, Thoreau wrote in his journal: "A week or two ago I brought home a handsome pitch pine cone, which had freshly fallen and was closed perfectly tight. It was put into a table-drawer. To-day I am agreeably surprised that it has there dried and opened with perfect regularity, filling the drawer, and from a solid, narrow and sharp cone has become a broad, rounded, open one, has in fact expanded into a conical flower with rigid scales, and has shed a remarkable

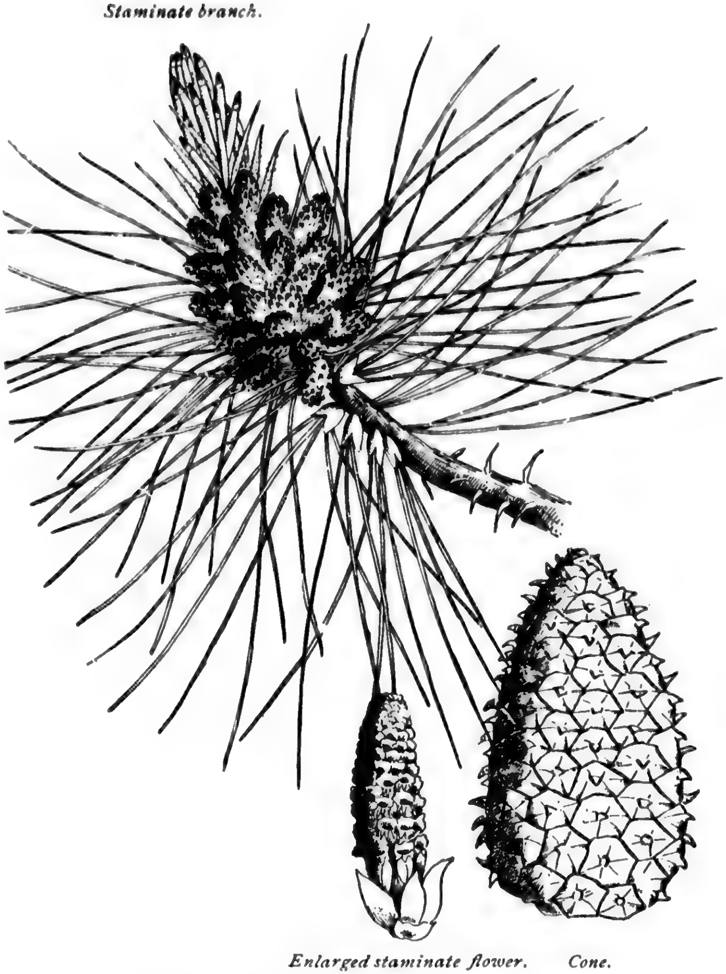

Staminate branch.
Enlarged staminate flower.
Cone.

PLATE CXXXIX. PITCH PINE. *Pinus rigida.*

quantity of delicate winged seeds. Each scale, which is very elaborately and perfectly constructed, is armed with a short spine pointing downward, as if to protect its seeds from squirrels and birds. That hard, close cone, which defied all violent attempts to open it, and could only be cut open, has thus yielded to the gentle persuasion of warmth and dryness.

"The expanding of the pine cones, that, too, is a season."

RED SPRUCE. (*Plate CXL.*)

Pìcea rùbens.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Pyramidal; branches, spreading.*	70-100 *feet.*	*Maine to Ga. westward to Minnesota.*	*May, June.*

Bark: reddish brown; scaly, or nearly smooth. *Twigs:* light green when young; slender; pubescent. *Leaves:* olive-green; simple; scattered closely along the branches; needle-shaped; straight or incurved above the middle; pointed or rounded at the apex; lustrous at maturity. *Cones:* from one to two and a half inches long; green, turning later to purplish brown; oval or ovoid, and falling at the end of the first season or during the winter. *Scales:* undulate; often two-lobed.

Although favouring gravelly slopes, the red spruce is also found in the forests along with the white pine, the balsam fir, the yellow birches and the sugar maples. It is most abundant in northern New England and New York. In fact it is the principal timber spruce of the northeastern United States. The dense groves often formed by it appear like waves of rich, dark colouring, and cast about deep and melancholy shadows. From the black spruce the tree is rather unsatisfactorily distinguished by the size and shape of its staminate blossoms and its cones. The latter are the larger of the two, and they mature and fall during their first winter. Those of the black spruce are often persistent for many years. Recent observations by Dr. Britton and by Prof. Peck, State botanists of New York, seem, however, to indicate that they are different forms of one species. The timber of the tree is similar to that of the black spruce. It is light and soft, closely grained, and has a beautiful surface like satin. For the flooring of houses it is much used. Paper pulp

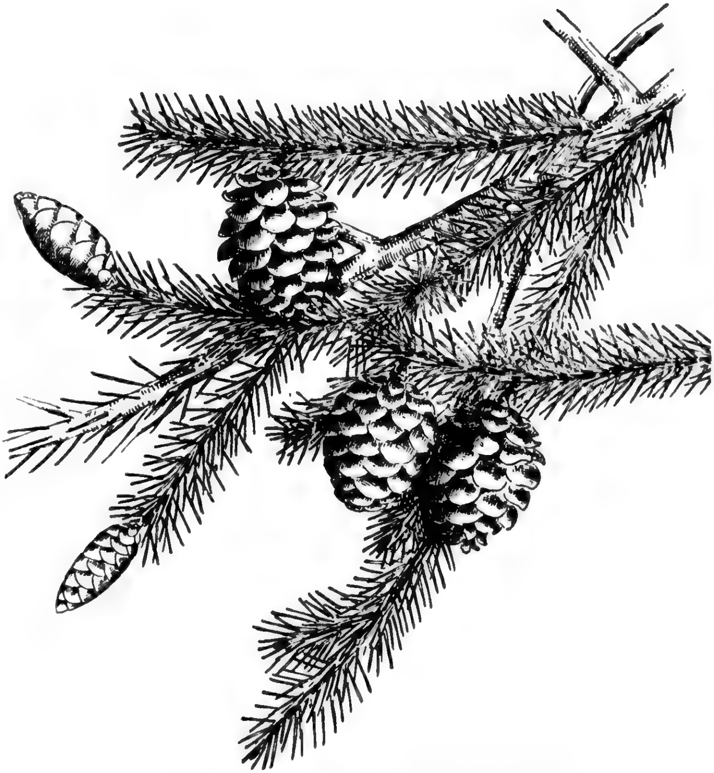


PLATE CXL. RED SPRUCE. *Picea rubens.*

is made from the wood, and much of the spruce beer that is manufactured owes its existence to this tree. In many places it springs up where once the white pine was known.

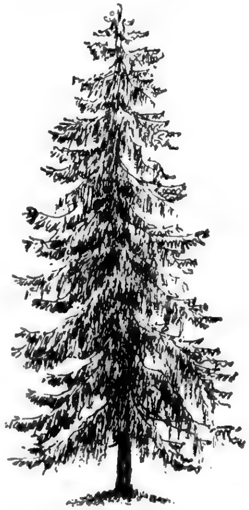
NORWAY SPRUCE. (*Plate CXLI.*)

Pìcea excèlsa.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Pyramidal; branches, low, inclined to droop.*	50-120 *feet.*	*Widely cultivated.*	*April, May.*

Bark: greyish black; rough. *Branchlets:* brown; stout. *Leaves;* dark olive-green; simple; scattered singly and closely about all sides of the branches; needle-shaped; four-sided; slightly curved; sharp. *Cones:* five to seven inches long; reddish brown; almost cylindrical, and hanging from the ends of the branches. *Scales:* large; pointed.

From the great forests of Norway this tree has been taken, and it is now so widely planted in this country that many regard it as a native. To all hardly any tree is more familiar, for its great size, its conspicuous cones and its drooping branches, with which it is often clothed to the ground, make it a marked figure anywhere. There are many varieties of it which are sold at the nurseries. From cultivation it sometimes escapes and apparently attempts to enjoy a state of freedom and abandon similar to that it has known in its native land. To watch the new leaves come on the spruces in the budding days of spring is a great delight. The extremities of all the branches are then tipped very delicately with a soft yellow-green, quite different from the weather-beaten look of the rest of the foliage which has upheld masses of ice throughout the winter. To the tree these young bits give a wonderful appearance of freshness and newness of life.



Pìcea excèlsa.

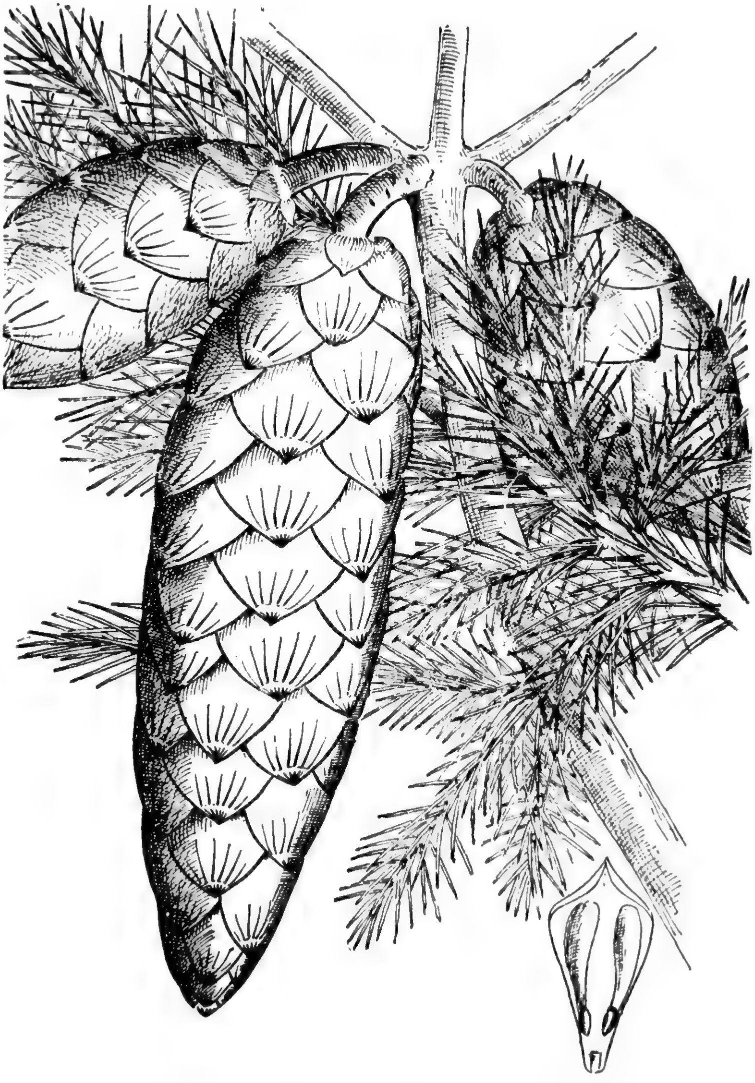

Scale of cone.

PLATE CXLI. NORWAY SPRUCE. *Picea excelsa.*

Trees Preferring to Grow in Light or Dry Soil: Upland Places, Meadows and Roadsides.

When low upon the meadows adjoining the roadsides hangs a mist so white as to suggest a phantom lake, and the air is chilled with a scent of moisture, then the time of the autumn haze has come. Through it dimly can be seen the outlines of trees. Trees at whose bases are soft beds of brown leaves. They have finished their work and their frolic with the high winds which have coaxed them away from the boughs. Grateful then must the trees feel to the mist that enshrouds them while grief for their loss is fresh, and before they have learned to silently appear naked before the winter.

SNOWBERRY. CORAL-BERRY. INDIAN CURRANT.

(*Plate CXLII.*)

Symphoricárpos Symphoricárpos.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Honeysuckle.	*Erect, spreading.*	2-5 *feet.*	*Ga. and No. Carolina northward.*	*July.* *Fruit: Sept.*

Branches: purplish brown; pubescent. *Leaves:* simple; alternate; with short petioles; oval; blunt or rounded at both ends; entire; glabrous above and pubescent underneath. *Flowers:* growing in small, dense, axillary clusters not as long as the leaves. *Calyx:* four to five-toothed. *Corolla:* white or reddish; campanulate; four to five-lobed. *Stamens:* included. *Berries:* bluish red; nearly globose and remaining on the branches after the leaves have fallen.

After the glories of the summer and the early autumn have departed, with the humility of natural beauty the warm, richly-coloured berries of this shrub illumine the landscape. It

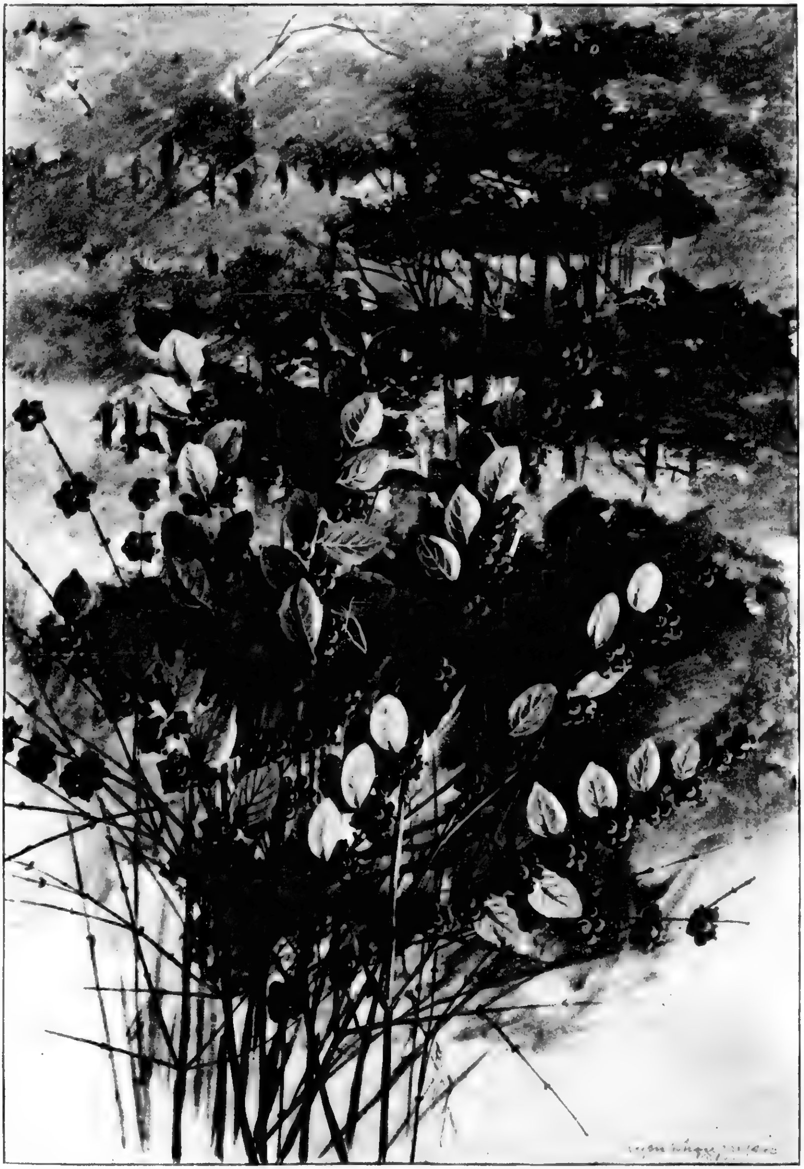


PLATE CXLII. SNOWBERRY. *Symphoricarpos Symphoricarpos.*

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seems as though their wealth of loveliness had been held in reserve for a time when other things should have faded, and as a compensation for their rather insignificant showing of flowers in the spring. They cling to the bushes throughout the winter, and are truly snowberries, for of the earth's soft, white cloak they have no dread.

In North Carolina the shrub is commonly seen, where it is much planted about old farmhouses. Bordering many of the drives of the Biltmore estate it is abundantly growing. The creeping roots of the shrub have a curious way of entangling themselves with other things, and not exactly respecting the laws of independence. On this account it has in some places been rather a nuisance on plantations, as is uniquely suggested to the mind by its name of "Devil's shoe strings." Not infrequently the snowberry gleams from among rocks and by the banks of streams.

SASSAFRAS. AGUE TREE. (*Plate CXLIII.*)

Sássafras Sássafras.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Laurel.	*Head, narrow, flat.*	15-50-90 *feet.*	*Eastern Mass. southward and westward.*	*April, May.* *Fruit: Aug.-Oct.*

Bark : dark, reddish brown ; irregularly broken, and furrowed. *Branchlets :* yellowish grey when young, peeling readily ; aromatic ; mucilaginous. *Leaves :* simple ; alternate ; petioled ; entire or two to five-lobed ; ovate or obovate; when two-lobed usually mitten-shaped ; the apex of the leaves and lobes bluntly pointed or slightly rounded ; taper-pointed at the base. *Sinuses :* when the lobes are present, rounded. Dark green ; shiny, becoming soon glabrous and often sprinkled with pellucid dots. *Flowers :* diœcious ; greenish yellow ; growing in umbel-like clusters and appearing with the leaves. *Calyx :* six-lobed. *Stamens :* nine. *Fruit :* blue ; growing on red pedicels ; oval ; one-seeded ; pungent.

It is always pleasant to come upon the sassafras, either when it grows in rich woods or in the dry, well-drained soil of the roadsides. In the spring especially, its drooping clusters of flowers attract us, as they shine pure and white among its quaint and young, flushed leaves. The large buds and the bark of the crisp, green shoots are also enticing ; for they are gifted

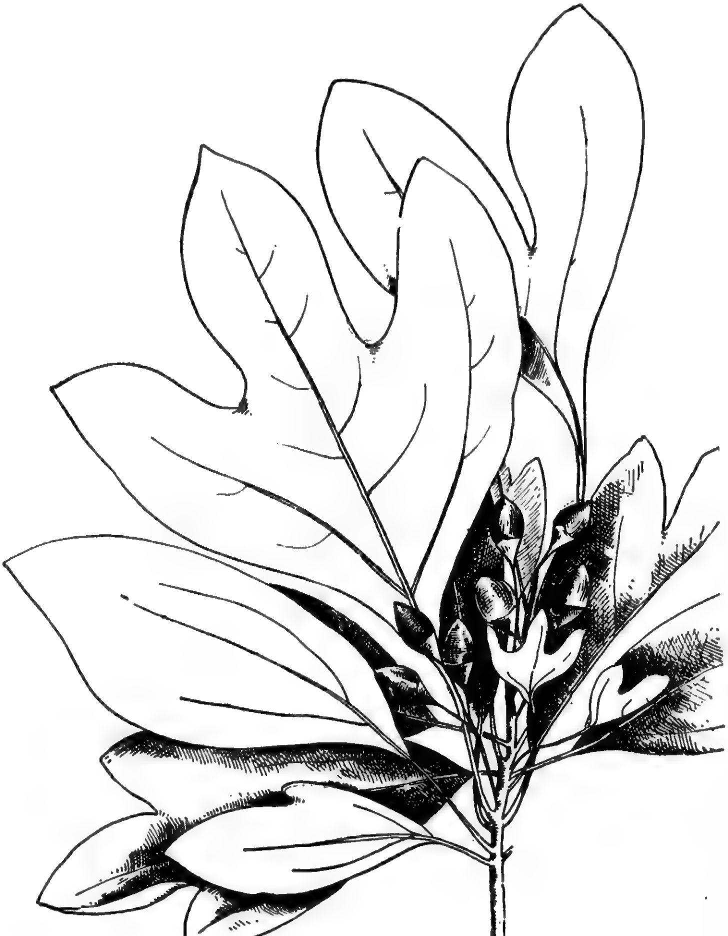


PLATE CXLIII. SASSAFRAS. *Sassafras sassafras.*

with a pleasant fragrance and spicy taste. About the foliage there is a wholesome, clean look, and in the autumn it turns to a delicate yellow and reddish hue. The brilliant fruit also adds greatly to its charm, but this is of short duration. The birds greedily devour it, as soon as its colour flashes upon their watchful eyes.

The wood of the sassafras is brittle, but it is also durable. From the bark of its roots a powerful, aromatic oil is extracted which is largely used as a stimulant. It has now, however, lost the flavour it formerly had in the treatment of rheumatism. Although the tree is reported to grow to the height of one hundred and twenty-five feet, it is rather small at the north and often becomes a shrub. Even in winter the bright, lustrous green is not driven from its twigs, and it is a cheery, encouraging sight.

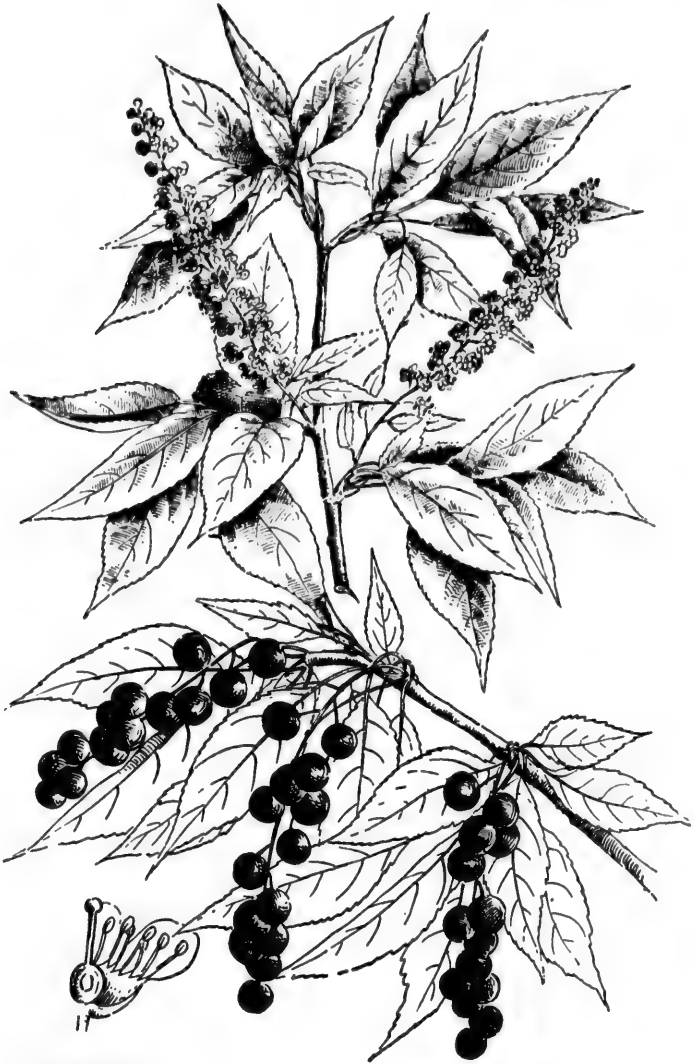
WILD BLACK CHERRY. RUM CHERRY. CABINET CHERRY. (*Plate CXLIV.*)

Prùnus serótina.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Plum.	*Head, narrow; branches, horizontal.*	50-90 *feet.*	*Southern Ontario to Fla. and westward.*	*May, June.* *Fruit: July-Sept.*

Bark: reddish brown or blackish; rough and broken into plates; becoming smoother towards the top of the tree. *Branchlets:* rich, reddish brown, and marked with tiny orange-coloured dots; aromatic; bitter. *Leaves:* simple; alternate; oblong or oval-lanceolate; taper-pointed at the apex and pointed or rounded at the base; finely serrate, with small, incurved teeth; at maturity glabrous; firm; glossy; the light coloured midrib very distinct. *Flowers:* white; growing on pedicels in long, slender racemes which terminate leafy shoots. *Calyx:* bell-shaped; five-lobed. *Corolla:* of five small petals. *Stamens:* numerous. *Pistil:* one. *Fruit:* almost black; a small, round drupe; vinous, although not disagreeable to the taste.

Such a pretty point is brought to mind by the illustration of the black cherry. In early spring when the bloom unfolds, it is so soft and light that its stem holds it uprightly in the surrounding atmosphere; but as it fades away and the rich, heavy fruit matures, the slender stalk is not equal to its weight. So it supplely bends and the clusters are seen drooping all through



Enlarged flower.

PLATE CXLIV. WILD BLACK CHERRY. *Prunus serotina.*

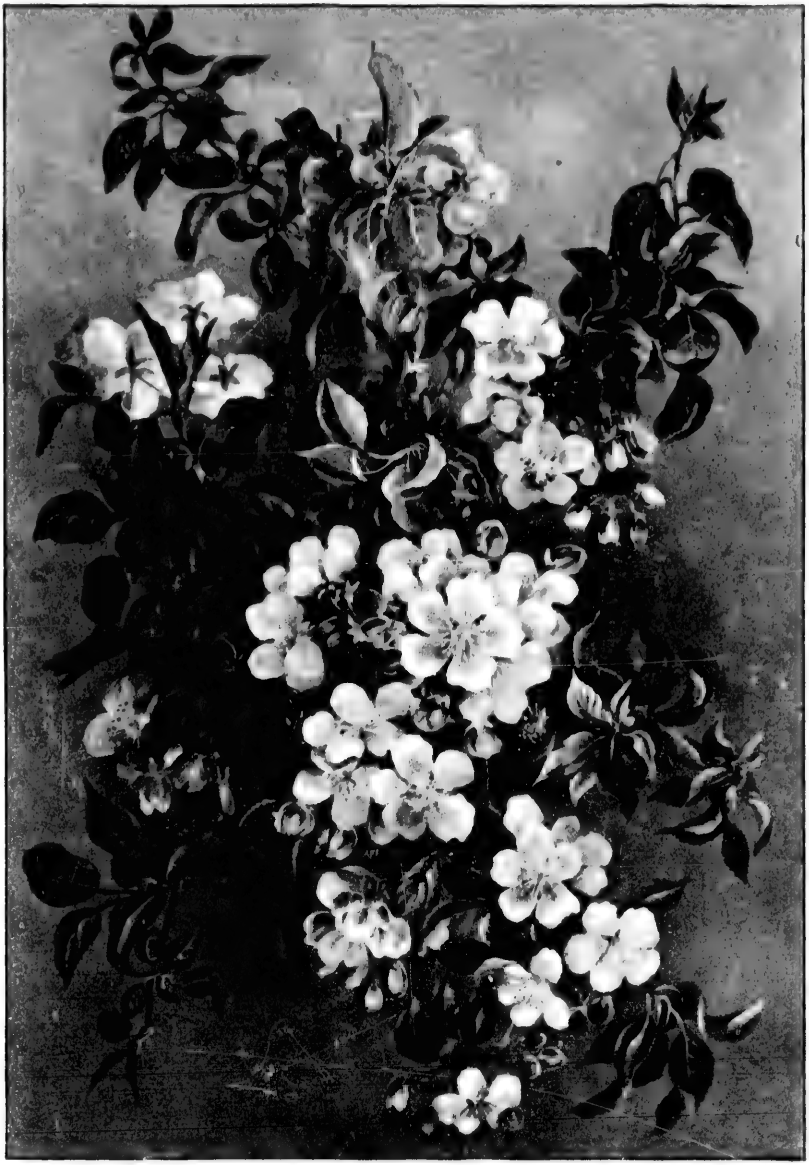


PLATE CXLV. APPLE. *Malus Malus.*

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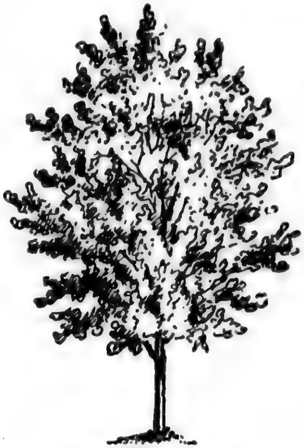
the bright foliage of the tree. Unfortunately it is not very discriminating about its soil, but along the roadsides and in the woods and glades the tree is a familiar character. Especially towards the northern limit of its range it forms a quantity of shrubby growth by fences. Little boys and wayfarers enjoy eating the fruit, and in many farmhouses there is reserved for especial occasions, in the corner of some old cupboard, a bottle of cherry bounce.

As a timber tree it is one of the most valuable of the American forest, but it is now becoming scarce. It was at one time a most prominent feature of the woodlands on the slopes of the Alleghany mountains. In texture its wood is firm and durable with a satin-like surface which receives a high polish. In cabinet work it is most conspicuous. When first worked the wood is quite light, but it becomes darker with time and exposure. There is none that is better coloured. From the aromatic bark which contains a bitter element a tonic is prepared, and it is reported to possess considerable efficacy in the curing of pulmonary complaints. From the vivid green inner layer the bark peels readily. In the autumn the foliage turns to a bright, cheery yellow.



Prùnus seròtina.

APPLE. (*Plate CXLV.*)

Màlus Màlus.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Round-topped, compact.*	15-35 *feet.*	*Introduced.*	*April, May.*

Bark: greyish. *Leaves:* simple; alternate; with woolly petioles; oval or ovate; bluntly pointed or rounded at the apex and rounded or cordate at the base; serrate, occasionally almost entire; bright green and nearly glabrous above, covered with a woolly down underneath. *Flowers :* white, tinted with pink and growing in an umbel. *Calyx :* covered with tomentum when young. *Fruit :* large; globose; depressed at the apex and base.

> " Come, let us plant the apple-tree
> Cleave the tough greensward with the spade;
> Wide let its hollow bed be made;
> There gently lay the roots, and there
> Sift the dark mould with kindly care,
> And press it o'er them tenderly,
> As, round the sleeping infant's feet,
> We softly fold the cradle-sheet;
> So plant we the apple-tree."
> —BRYANT.

When scattered over the country and in among the other trees there are those that appear like rosy-tinted snowballs, it is the time of the apple trees' blooming. From the swelling of their buds to the advent of the full-grown petals which quiver against the intense blue of the sky and exhale their faint perfume, the earth seems suddenly to have lost its wits in the excess of extravagance. But such a holiday mood could hardly be of long duration. There is work to be done, and fruit must grow and ripen. So the blossom storm carries away the dainty flecks of white, and sombreness comes back again.

It is then the turn of the foliage to expand, to become dense and to provide shelter for the protection of the forming fruit.

Although a cultivated tree, and one that has been introduced from Europe and western Asia, it lingers so often by the lanes and waysides of this country and its boughs of fruit so temptingly appeal to the wayfarer that it has here been accorded a place. To study the trees and forget the common apple would be sad indeed.

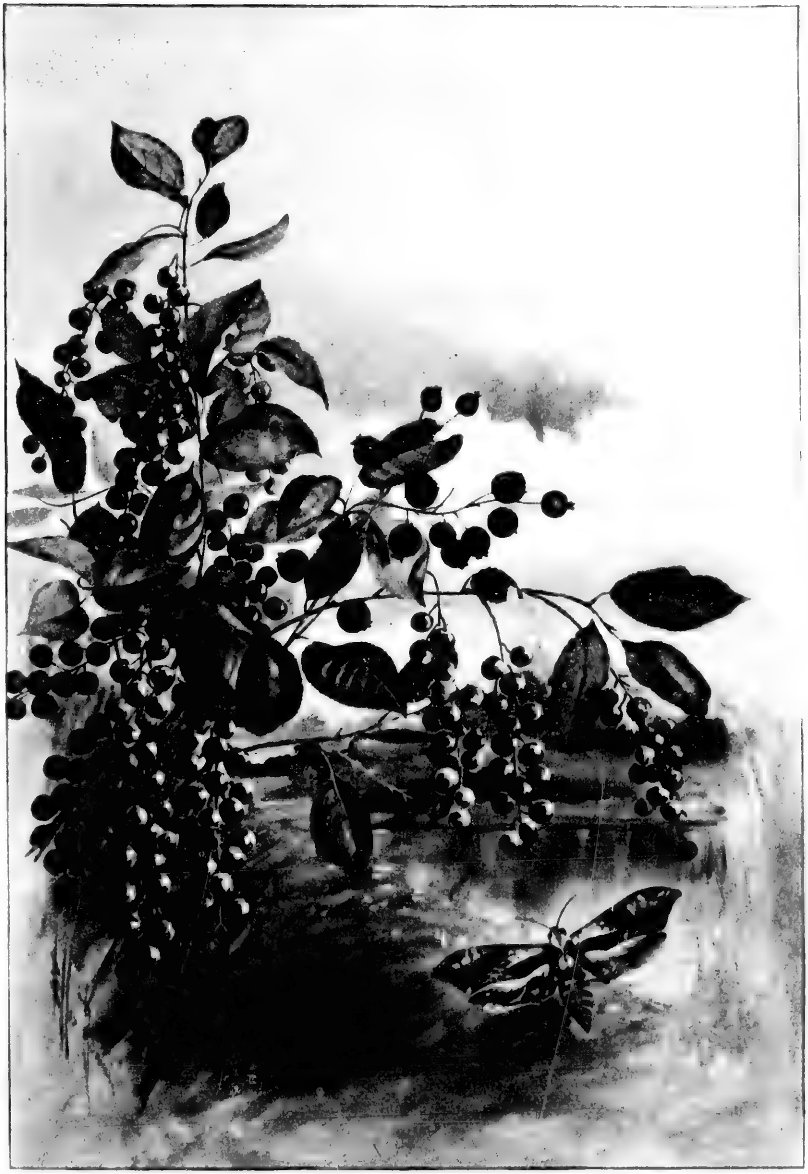


PLATE CXLVI. { JUNE-BERRY. *Amelanchier Canadensis.*
CHOKE-CHERRY. *Prunus Virginiana.*

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JUNE-BERRY. SERVICE-BERRY. MAY-CHERRY.

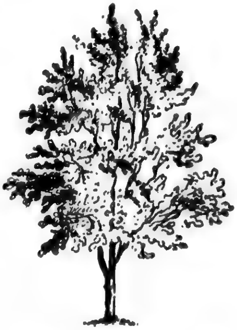
(*Plate CXLVI.*)

Ameldnchier Canddensis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Apple.	*Head, round-topped; branches, spreading.*	10-50 *feet, or higher.*	*New Foundland westward, southward to Fla. and Louisiana.*	*March-May.* *Fruit: June, July.*

Bark: purplish brown; ridged. *Bud-scales and bracts:* sticky. *Leaves:* simple; alternate; slender petioled; ovate, with at times, bristle-pointed apex and rounded or slightly cordate base; finely serrate; dark green and dull above, paler below and becoming glabrous at maturity; thick. *Flowers:* white; large; growing in terminal, loose racemes and appearing before the leaves. *Calyx:* five-cleft. *Corolla:* of five almost linear petals notched at the apex. *Stamens:* numerous. *Pistils:* numerous. *Fruit:* a small red or purplish pome; sweet; edible.

Even to those,—and there are perhaps many,—that walk through the woods and pastures without ever hearing the music passing through the tree-tops and quivering in the insects' wings, and whose eyes are never caught by the subtle unfoldings of spring, the white bloom of the shad-bush, gleaming through the almost bare branches of other trees, must be an event in the year. There is no passing it by; it is one of the spirits of nature that the dullest eye must see and admire. Even the pink of its buds is an exquisite tint. The fleecy white petals seem to wave and beckon in the breezes as though to attract the attention, and do so at a season of the year when there is little foliage to hide them from view. It is then that the knowing ones sigh as with relief and feel grateful that the spring is indeed on its way. The winter has passed; the shad are running in the waters. All along the shrub is a leader of the seasons. As early as June its fruit becomes crimson, and at the approach of autumn the leaves turn bright yellow.



Ameldnchier Canddensis.

The Indians and birds seem to vie with each other in their appreciation of the berries. Early they seek them. The birds to enjoy a feast and afterwards to scatter the seeds, and the Indians to manipulate them into a sort of cake which they greatly relish and find wholesome. After the berries are crushed, they place them in the sunshine where they harden into a paste. This they prudently put by for use during the winter months. Along the Atlantic coast and through the Gulf states *Amelanchier Botrgapium*, the shad-bush, a related species, with broader, shorter petals, is only known as a shrub. The wood of Amelanchier Canadensis is fine and capable of receiving a high polish.

A. alnifólia, northwestern June-berry, occurs throughout the northwest as a shrub from three to eight feet high, or as a tree as tall as forty feet. Formerly it was regarded as a variety of the preceding species. Its shorter petals and more rounded fruit are marks by which it may be known. There are, in fact, several wild species of the genus whose differences are not very great. As a genus they are readily known.

PEACH. (*Plate CXLVII.*)

Amýgdalus Pérsica.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Plum.	*Scraggly.*	*About 10 feet.*	*New York to North Carolina.*	*April, May.*

Bark; purplish brown; smooth; bitter. *Leaves;* simple; alternate; growing in clusters along the stem and terminating the branches; lanceolate; finely serrate; bright green above and glabrous; thick; bitter and containing prussic acid. *Flowers;* purplish pink; growing singly from scaly buds along the branches and appearing before the leaves; almost sessile. *Calyx:* tubular; bell-shaped, with five spreading lobes. *Corolla:* of five petals. *Stamens:* numerous on the throat of the calyx. *Pistil:* one. *Fruit:* globular; velvety and containing a deeply-wrinkled stone; the kernel flavoured with prussic acid.

Amygdalus Pérsica.

Although in a truly wild state this lovely flowering tree is unknown, it sometimes strays from the gardens to the waysides. Here amid the medley of tender greens that stand out from a background of brown and purple and are tipped with golden, the brilliant masses of blossoms give a life and inspiration to the landscape that is typical of the

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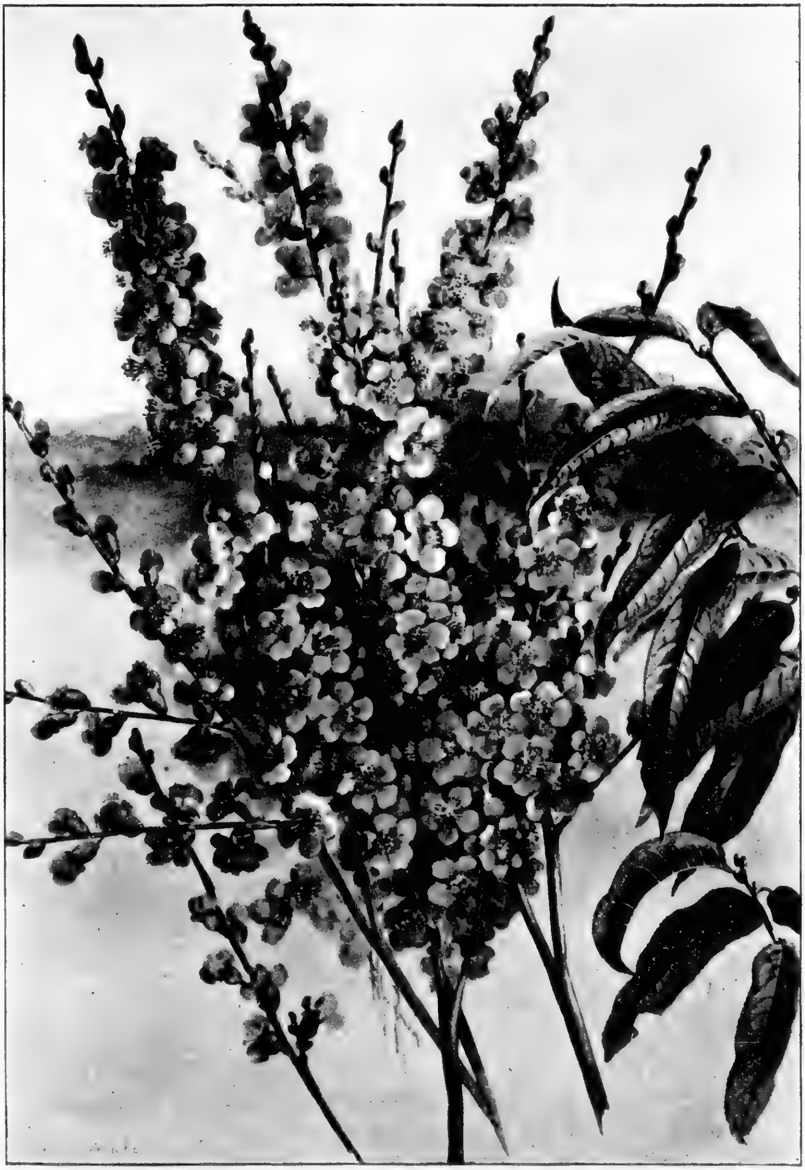

PLATE CXLVII. PEACH. *Amygdalus Persica.*

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springtime. Spring is, in fact, as the poets never grow tired of telling us, the time to enjoy the fullness of life in the country. Bowers of colour are everywhere, and what has been grey and apparently dead during the winter is budding. An old slanting roof within a small enclosure is transformed by the peaches' spray into a garden that rivals those of Japan.

SILVER-LEAF POPLAR. WHITE POPLAR. ABELE.

(*Plate CXLVIII.*)

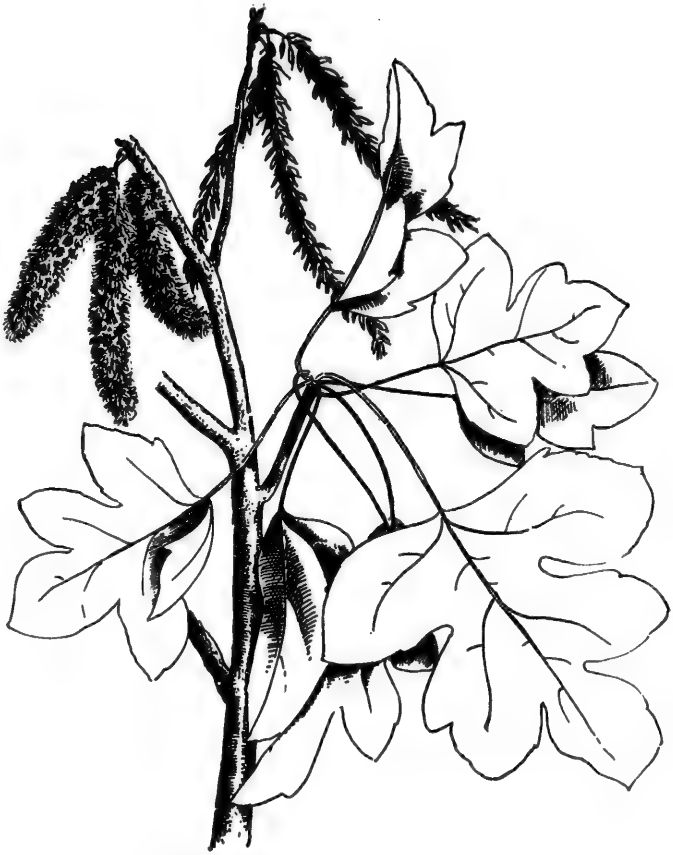
Popúlus alba.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Tall, round-topped.*	30-100 *feet.*	*Introduced New Brunswick to Virginia.*	*March-May.*

Bark: light grey; furrowed at the base and becoming smoother towards the top. *Buds:* not glutinous. *Leaves:* simple; alternate; with rounded and downy petioles; rounded-ovate; cordate at the base, with from three to five pointed lobes; finely serrate; dark green and smooth above, white and cottony underneath. The young leaves covered with down on both surfaces. *Staminate flowers:* growing in long, drooping catkins.

The roadsides that have about them the greatest charm are those that are shady, and in summer time, when the sun is high, they are sought with gratitude by both man and beast. Often along their borders an introduced tree will be mingled with those that are natives; sometimes this is so even in remote places, and far away from any habitation. This has been noticed about Populus alba. How has it come there is then wondered. To follow, however, in imagination one of its fine, tufted seeds as it is carried along by a playful breeze, is to find that although it may rest awhile in some nook to-day, to-morrow it will be taken up again, and perhaps again later, and may not reach its final destination until a considerable distance has been travelled. Much of the growth of this poplar that we ordinarily see, however, is from the innumerable suckers that spring up from the bases of the old trees, and which also mar the beauty of many that are younger.

East of the Alleghanies the tree is very common. It grows, as well as in dry soil, by the side of streams and in moist woods.



Pistillate branch.

PLATE CXLVIII. SILVER-LEAF POPLAR. *Populus alba.*

As early as March the shining brown scales which cover its flower-buds begin to respond to the tempered atmosphere. Then they split open and are among the first to send into the world their grey and rosy-tinted offsprings.

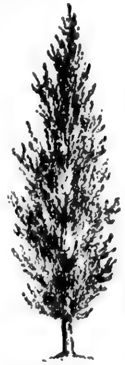
LOMBARDY POPLAR. (*Plate CXLIX.*)

Popúlus dilatàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Willow.	*Tapering; branches, perpendicular.*	30-60 *feet.*	*Planted.*	*April, May.*

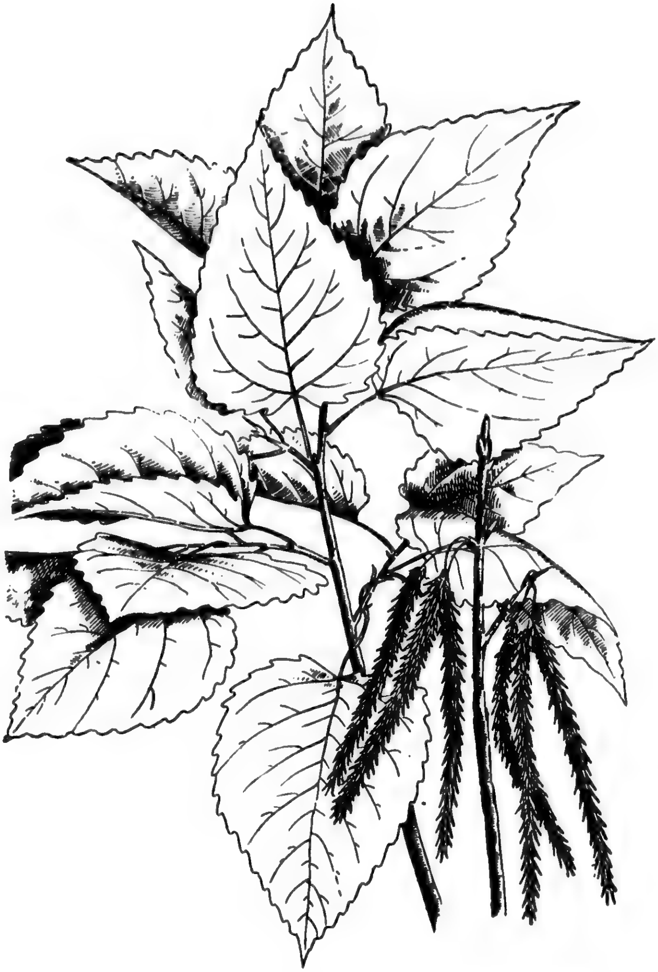
Bark: roughish. *Branches:* growing closely together. *Buds:* possessing a glutinous substance, like balsam. *Leaves:* simple; alternate; with petioles which are flattened sidewise; very broadly oval; pointed at the apex and at the base; finely serrate; smooth. *Flowers:* diœcious; growing in catkins.

As in the human family, we find that every tree has its own particular appearance,—one to which it remains true both in sunshine and in shade. Even although it loses its leaves in winter time, its outline is then quite as well known to tree lovers as when it is fully clothed with verdure. In its manner of growth there is hardly any tree that is more distinct than the Lombardy poplar, and it is perhaps for this reason that it is so generally known. Constantly it is being referred to as though it were the only species of poplar in existence. About one hundred years ago it was imported from Italy and soon began to be much planted in this country. Through cultivation it has spread widely and also by the means it employs of sending up shoots from its buried parts. At present it is not nearly so much seen as formerly; for insects have bored into its trunk and preyed greatly upon its foliage. In parts of New Jersey, where it was once almost as common as the indigenous trees, it is now rarely seen.



Popúlus dilatàta.

Not by all is the symmetrical, uncompromising aspect of the tree admired, nor does its stiff outline blend with every variety of landscape; but it is beloved by many that have with it



Pistillate branch.

PLATE CXLIX. LOMBARDY POPLAR. *Populus dilatata.*

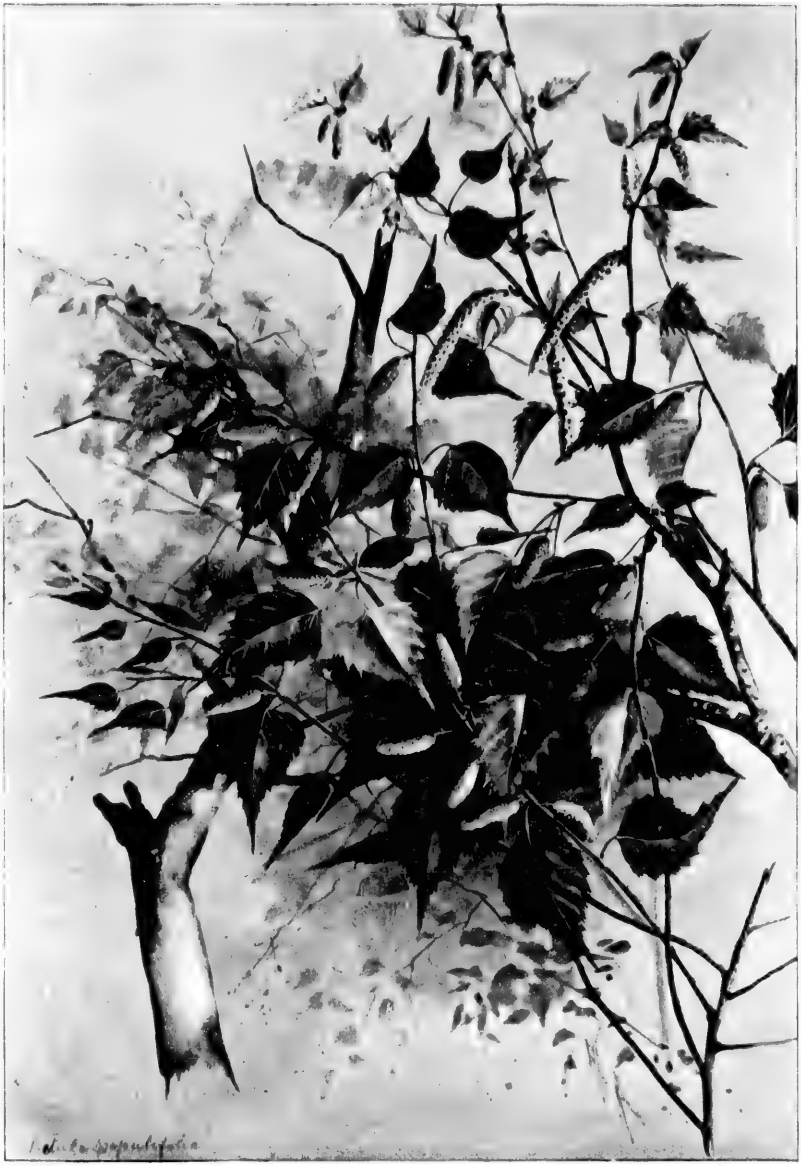


PLATE CL. WHITE BIRCH. *Betula populifolia.*

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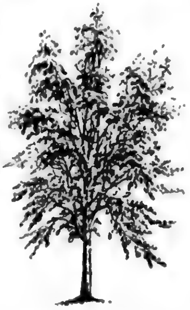
pleasant associations and again because it is a tree at once recognised. To know a tree does much in fact towards awakening the affections.

AMERICAN WHITE BIRCH. OLD-FIELD BIRCH. GREY BIRCH. (*Plate CL.*)

Bétula populifòlia.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Pyramidal; branches, often pendulous.*	15-40 *feet.*	*New Brunswick to Ontario, southward to Delaware.*	*May.*

Bark of trunk: chalky white; smooth; not peeling readily. *Young branches:* rich, reddish brown, and spotted with wart-like dots. *Buds:* sessile; scaly. *Leaves:* simple; alternate; with long, slender petioles; sometimes in pairs; almost triangular; pointed at the apex, and squared, rounded or pointed at the base; unevenly serrate; often becoming entire at the base; bright green, lustrous and glabrous above, lighter underneath and almost glabrous at maturity. *Flowers:* yellowish green; growing in scaly catkins. *Staminate ones:* from two to four inches long, and having three tiny flowers under each bract. *Stamens:* four; short. *Pistillate catkins:* with two to three blossoms under each bract. *Ovaries:* naked. *Fruit:* broadly winged.



Bétula populifòlia.

The white birch is one of the restless, short-lived spirits of the woodlands. It is delicate and beautiful with leaves almost as tremulous as those of the aspen. Through it, a stream of tenderness seems to flow, for its trunk too is flexible, and often during the winter bends under the load of ice it has to uphold. Its powers of endurance are greatly in contrast to those of many of the trees, the oaks especially.

Of the birches of Eastern North America it is the smallest and least widely distributed. On lands that have been devoured by fire or those that have been abandoned by farmers, it springs up quickly. In southern New England it is frequently found growing on the margins of swamps. Hardly a tree more graceful or sylph-like is known in cultivation, when its white bark and exquisitely-shaped and fluttering leaves show to great advantage.

Bétula pendúla.

Commercially it is not of any very great value. Its soft, weak wood is too perishable. Spools and barrel-hoops are made from it, and upon the hearth it finds a welcome place.

Bétula pendúla, weeping birch, is a European species, which is extensively planted in this country. Its drooping branches and delicate, soft leaves are extremely attractive.

HOP-HORNBEAM. IRON-WOOD. LEVERWOOD.

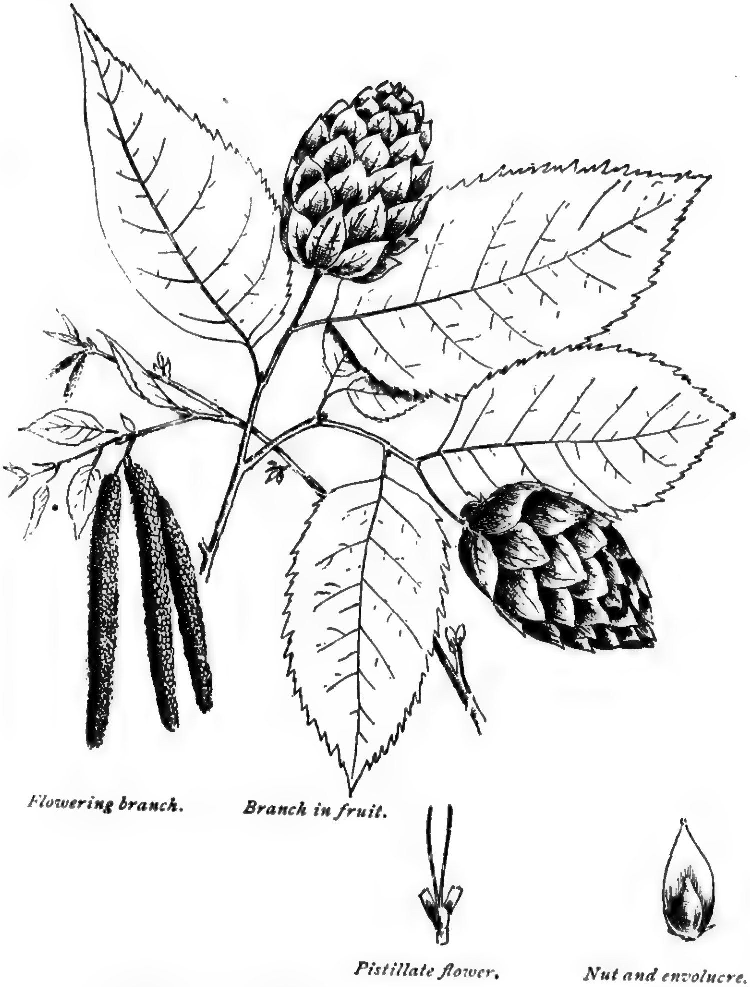
(*Plate CLI.*)

Óstrya Virginiána.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Birch.	*Head, round; branches, drooping at the ends.*	20-60 *feet.*	*From the north, southward and westward.*	*April, May.* *Fruit: July, Sept.*

Bark: brownish; furrowed vertically, and scaly. *Branchlets:* purplish brown, and dotted with grey; lustrous. *Leaves:* simple; alternate; with short, rough petioles; oblong-lanceolate; taper-pointed at the apex and rounded at the base; often unequal; doubly and sharply serrate; dark, yellow-green above; almost smooth; lighter coloured below and tufted in the axils of the straight veins. *Flowers:* growing in long catkins; the staminate ones about two inches long, with scales fringed on the margins. *Pistillate catkins:* shorter. *Fruit:* green; growing in long, drooping, hop-like strobiles, with entire, overlapping scales, or sacs which are bristly at their bases. *Nuts:* flattened.

Those that see this tree usually stop awhile and carefully regard its birch-like leaves and its swinging clusters of yellow-tinted fruit. Both are very beautiful, but hardly more so than are its flower clusters when they begin to lengthen in early spring. It is said that the furrows on the bark of this tree are finer than those of any other with a rough bark, and that, as it grows older, this feature becomes more pronounced. It contains considerable tannin. The tree is very shapely and generally small. It is not common. For this reason its wood which is hard and strong and receives a high polish has



Flowering branch.
Branch in fruit.
Pistillate flower.
Nut and envolucre.

PLATE CLI. HOP-HORNBEAM. *Ostrya Virginiana.*

not the value to which it would be entitled if it could be procured in larger quantities.

All living in and about New York have an opportunity to study the tree as it has been most abundantly planted in Central Park.

POST OAK. IRON OAK. BOX WHITE OAK. ROUND-LEAVED WHITE OAK. (*Plate CLII.*)

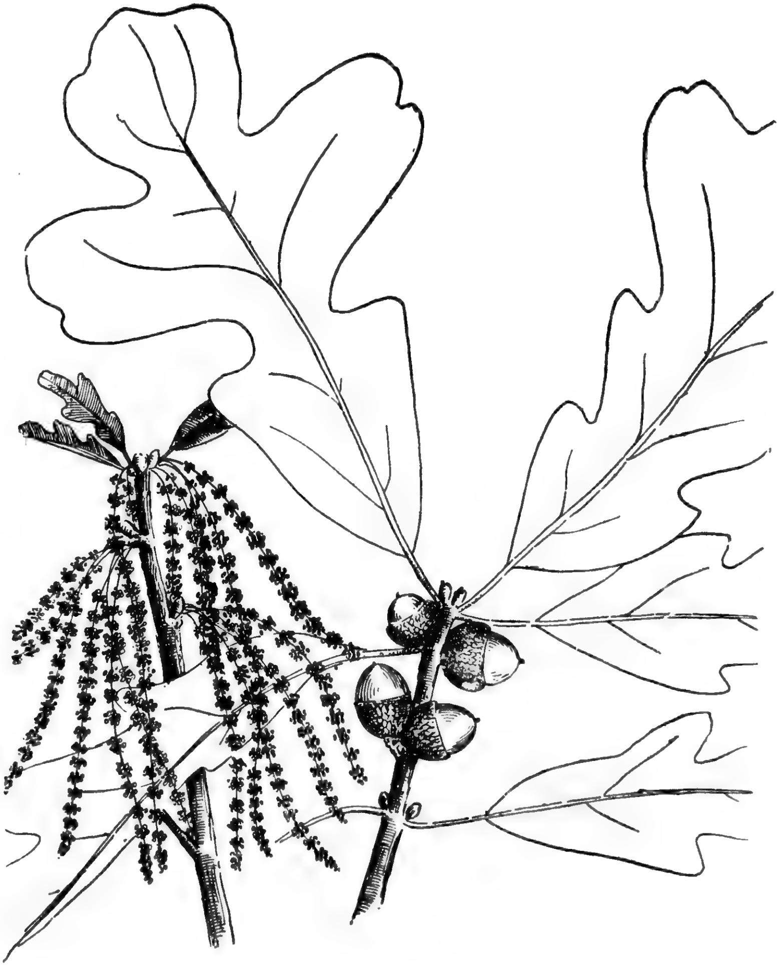
Quércus mínor.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Head, round, dense; branches, spreading.*	20-100 *feet.*	*Mass. southward and westward to Indian Territory and Texas.*	*May, June.* *Fruit: Sept., Oct.*

Bark: rather dark grey; rough but slightly so in comparison to other oaks, excepting the white oak. *Leaves:* simple; alternate; long-obovate; with rounded or wedge-shaped base, and having from three to seven variously shaped lobes, frequently spreading out at almost right angles from the midrib. At the apex they are lobed, or hollowed and become narrow or remain square at the base; dark green and shiny above with fine hairs, lighter coloured and downy underneath; thick; coarse. *Flowers:* appearing before the leaves are partly grown. *Staminate catkins:* three or four inches long. *Pistillate ones:* sessile. *Acorns:* two or three growing on a short stem, or solitary, and almost sessile. *Cup:* deeply saucer-shaped, with small, lanceolate scales often fringed at the margin. *Nut:* small; dark brown, delicately striped and lustrous; oval; very sweet.

Quércus mínor.

What is the object, we sometimes wonder, to which trees direct their growth, and why are some of them content to be low while others are lofty, and why do many remain weak when others grow strong? It is not difficult to trace the aspirations of the oaks; they are visibly for power and endurance. Quercus minor displays it, in its compact, rough manner of growth, which is so noticeable that the tree could hardly be mistaken for a member of any other genus. Its dark foliage too is ruggedly and distinctively cut. Throughout the south where the tree



Staminate branch.

PLATE CLII. POST OAK. *Quercus minor.*

is well known its wood is especially valued. For railroad ties, staves, cooperage, ship-building and many purposes it is used. In quality it is similar to that of the white oak, page 188, and in fact the trees were for a long time confused one with the other.

Towards the western limit of its range it grows abundantly with Black-Jack, *Quercus Marylandica*, and forms a belt which was familiarly known to early settlers of that part of the country as "Cross Timbers." In New England the post oak often becomes a shrub, when its branches are low and contorted.

BLACK-JACK. BARREN OAK. (*Plate CLIII.*)

Quércus Marylándica.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Head, irregular; branches, stout, contorted.*	8-35-50 *feet.*	*Long Island southward and westward.*	*May, June.* *Fruit: Oct., Nov.*

Bark: blackish; rough; ridged and separating into close scales. *Leaves:* simple; alternate; broadly obovate; rounded or slightly cordate at the base, widening above the middle of the leaf and forming three or five very short, slight lobes; rounded at the apex or slightly pointed; bristle-tipped. *Sinuses:* shallow; dark green and glossy above with fine star-like hairs, covered with a rusty pubescence underneath when young, at maturity glabrous. *Ribs:* distinct and branching conspicuously above the middle. *Staminate catkins:* two to four inches long; pubescent. *Pistillate ones:* growing on short peduncles and covered with a white wool. *Acorns:* small; ovoid; sessile or nearly so. *Cup:* deep; top-shaped; and covered with coarse, compressed scales; pubescent. *Nut:* dark brown; edible; sweet.

There is something very interesting about Black-Jack. Perhaps it is its common name which fixes it so firmly in the memory and makes the tree an old friend after it has once been seen. Much character is displayed about its unusually shaped leaves, and although they have somewhat departed from the orthodox conception of beauty, they have a firm, broad outline of their own. When they unfold in the spring they are bright pink on the upper side, a feature curious to recall when they have attained their large size and dark, lustrous greenness of maturity. Black-Jack has a decided preference for dry, sterile soil. The wood it bears is dark brown and strong, but it checks badly in drying. It is therefore mostly used for fuel and for making charcoal.

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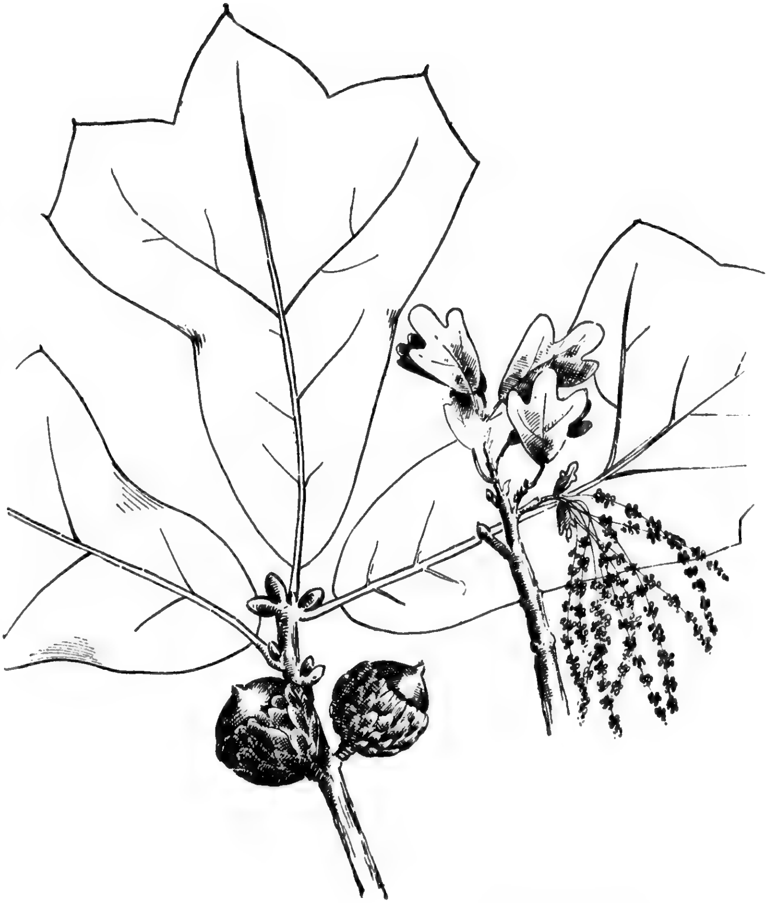

Staminate branch.

PLATE CLIII. BLACK-JACK. *Quercus Marylandica.*

ROCK CHESTNUT OAK. SWAMP CHESTNUT OAK. CHESTNUT OAK. (*Plate CLIV.*)

Quércus Prìnus.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Head, broad, irregular.*	40-80-100 *feet.*	*Maine southward to Del., Ky. Tenn. and Ala.*	*May, June.* *Fruit: Oct., Nov.*

Bark: blackish or reddish brown; ridged and separating into close scales. *Leaves:* simple; alternate; broadly-obovate or oval, with bluntly pointed apex and rounded or slightly pointed base; evenly and crenately toothed, the teeth decreasing in size as they reach the apex; dark green and glabrous above, paler and downy underneath. *Acorns:* growing in pairs or solitary on a short peduncle. *Cup:* rounded; thick and covered with minute, thin scales. *Nut:* brown at maturity; long-ovate or ovoid; edible; slightly sweet.

That the oaks are silent expressions of strength has been told in the folk-lore and poetry of every nation whose soil they inhabit; but it was the Autocrat of the Breakfast Table who explained that while "others shirk the work of resisting gravity, the oak defies it. It chooses the horizontal direction for its limbs so that their whole weight may tell,—and then stretches them out fifty or sixty feet, so that the strain may be mighty enough to be worth resisting. At 90° the oak stops short; to slant upward another degree would mark infirmity of purpose; to bend downward, weakness of organization."

Of the latter tendency one would never suspect the rock chestnut oak, and few of its genus are constructed to display more vigour. It also lives to a venerable age and seems like the patriarch of the generation to the more perishable trees, the flowers and grasses that grow under its shade. The tree is known as an Appalachian one and makes, on the dry hillsides of Carolina and Tennessee, its best growth. Although its wood is not nearly so valuable as that of the white oaks, it has still a field of usefulness in the making of railroad ties and fences. From its bark an unusually large quantity of tannin is extracted. The tree was one of the first of the American oaks to be known in Europe.

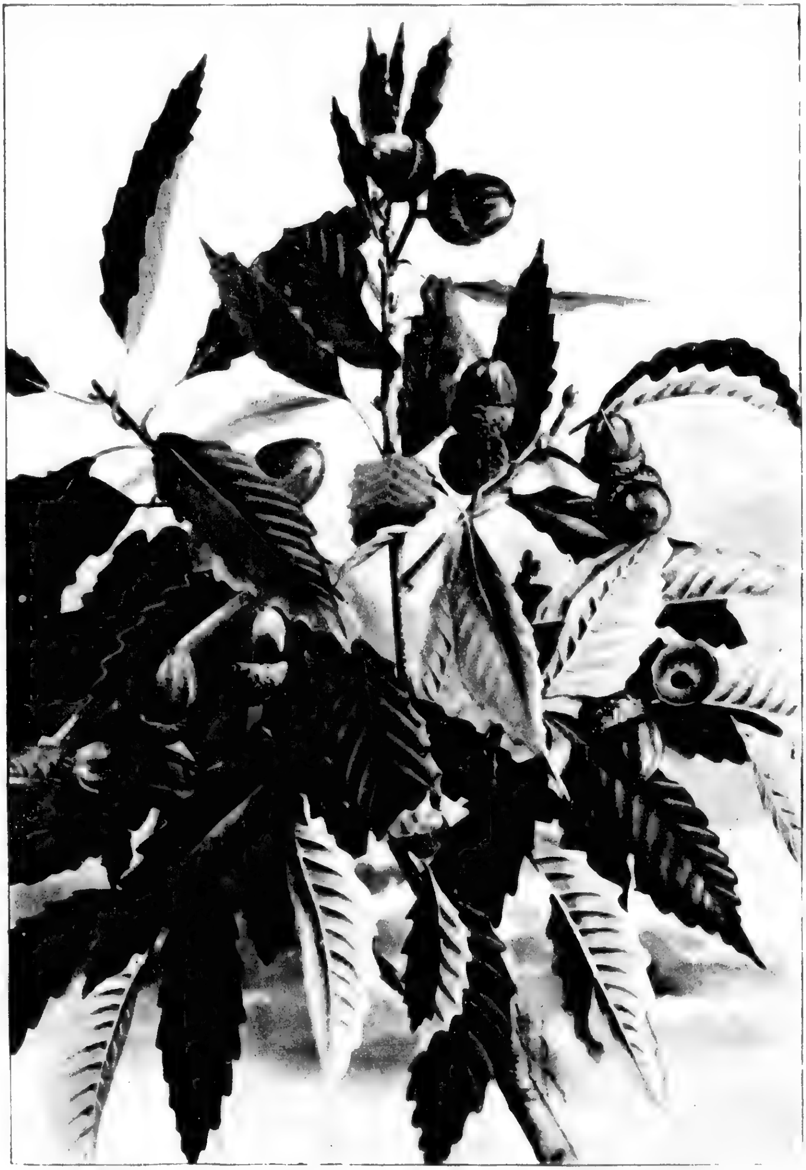

PLATE CLIV. ROCK CHESTNUT OAK. *Quercus Prinus.*

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CHESTNUT OAK. YELLOW OAK. (*Plate CLV.*)

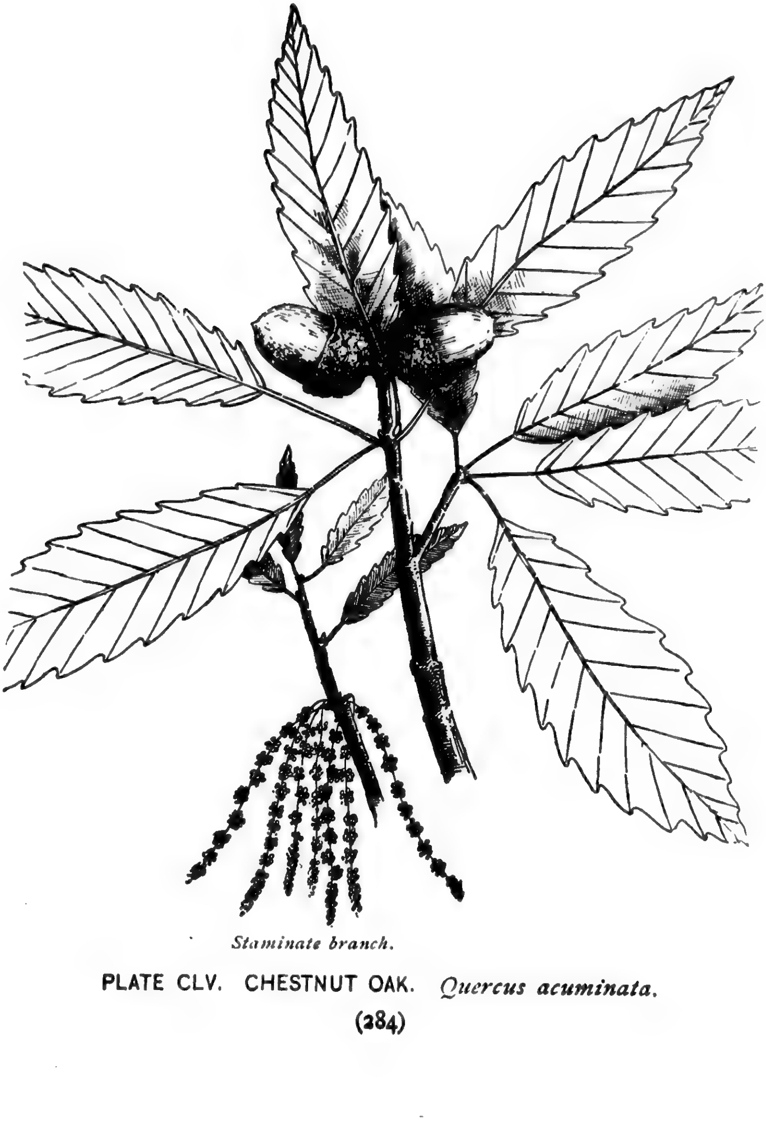
Quércus acuminàta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Beech.	*Tall, straight; head, narrow.*	40-80-160 *feet.*	*Vermont to northern Ala. and westward.*	*May, June.* *Fruit: Oct., Nov*

Bark: light grey; broken into thin flakes. *Branchlets:* marked with pale lenticels. *Leaves:* five to seven inches long; simple; alternate; petioled; at most an inch long; lanceolate, or obovate with taper-pointed apex and pointed, wedged-shaped or blunt base; sharply and evenly serrate. *Sinuses:* rounded. The veins extending from the midrib to the summit of the teeth. Yellow-green and glabrous above, silvery and slightly downy underneath. *Staminate flowers:* growing in catkins from three to four inches long. *Pistillate ones:* in short, sessile spikes. *Acorns:* small; sessile. *Cup:* round; broad; thin; the scales closely compressed. *Nut:* light brown; ovate; about one-third covered by the cup; edible; sweet.

Those that have paid little or no attention to the trees, excepting perhaps to regard them as affording a gracious and wholesome shade, are invariably surprised when their interest in them is quickened to see how exquisite are many of the blossoms with which they are hung in the spring. Then it is a revelation that the long yellow clusters, looking like bits of string, which dangle from this great oak are in reality its staminate flowers. In this way many of them grow snugly together. The pistillate blossoms are congregated in more compact clusters, and, as in many monœcious trees, they are located near the tips of the lower boughs. From the top-most branches the staminate ones sway. That their respective positions are such is another illustration of Nature's theory that nothing is insignificant. When the breezes bend the tree-tops the pollen is shaken out, and its natural fall is then downward upon the pistillate ones which eagerly arrest its flight.

This chestnut oak is a beautiful and mighty tree, with a pale, almost white bark. Its long leaves hang closely to the branches and resemble, in general outline, those of the true chestnut. That is when it grows in the Atlantic states, where it is somewhat rare and local. West of the Alleghanies it inhabits rich bottom lands. Its leaves then are very variable. In their broadest forms, with their teeth considerably rounded, they



Staminate branch.

PLATE CLV. CHESTNUT OAK. *Quercus acuminata.*

closely resemble those of *Quercus Prinus.* But the difference in the quality and colouring of the bark of the two trees would prevent their being mistaken for one another.

The wood of Quercus acuminata is used in cooperage.

BLACK-HAW. STAG-BUSH. (*Plate CLVI.*)

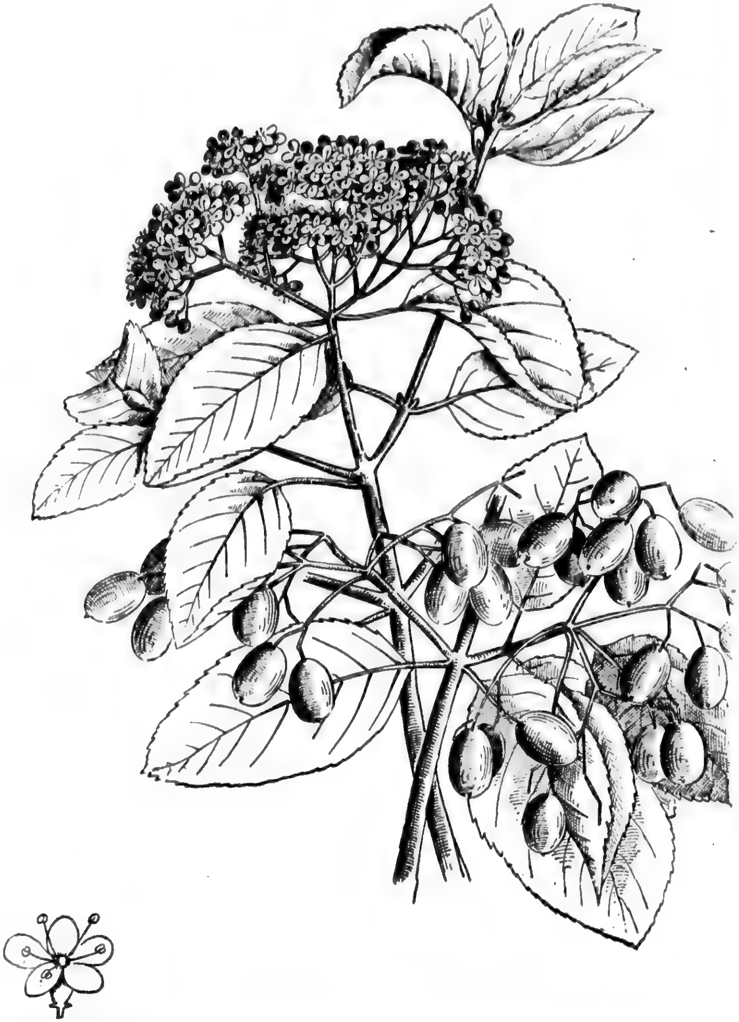
Vibúrnum prunifòlium.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Honeysuckle.	*Low, branching.*	15-20 *feet.*	*Conn. and N.Y. to Fla. and Texas.*	*May.* *Fruit: Sept.*

Wood: reddish brown; hard. *Leaves:* simple; opposite; with short, slightly or rarely margined petioles with straight edges; broadly oval, or obovate; pointed or blunt at the apex and base; very variable; finely serrate; the teeth sharp; glabrous; lustrous. *Flowers:* white; small; perfect; growing in compound, sessile cymes at the ends of the branches. *Fruit:* dark blue; oval; glaucous; edible; sweet.

Just before the earth begins to grow green and tiny leaves venture to show themselves and to shiver, there is about it something very clean and russet looking. Everywhere small harbingers of spring are peeping out, and they seem to enjoy having things pretty much their own way. Later in the season we owe an abundance of bloom to the Viburnums. Throughout the north the black-haw is most frequently found as a low, branching shrub of about six, eight or twelve feet high. Its leaves are smaller than those of *Viburnum lentago*, page 82, and the differences in the margins of the petioles serve as a means of their identification. Its cymes of flowers stand out well from the leaves. Besides these particular features the shrub is one that grows in dry soil.

V. acerifòlium, maple-leaved arrow-wood, or dockmaxie, is a shrub of about six feet high. Its bloom—broad cymes of small white flowers—which grows on long peduncles, is very familiar to us in the early days of spring; and later its bright crimson drupes, turning eventually to black, are very noticeable. The leaves might be mistaken, and frequently are, for those of a young maple tree. In dry or rocky woods, or abundantly along shady roadsides, the plant is found.



Enlarged flower.

PLATE CLVI. BLACK-HAW. *Viburnum prunifolium.*

STAGHORN SUMAC. VINEGAR TREE. (*Plate CLVII.*)

Rhus hirta.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Sumac.	*Umbrella-like.*	10-40 *feet.*	*New Brunswick westward, southward to Alabama.*	*June.* *Fruit: Aug.-Oct.*

Bark: dark brown; smooth. *Inner bark:* yellow. *Branchlets and leaf-stems:* covered thickly with a velvety, crimson down. *Juice:* milky; viscid, and turning black with exposure to the atmosphere. *Leaves:* compound; alternate; with stout stalks, reddish on their upper sides; odd-pinnate with from eleven to thirty-one, narrowly oval, sessile leaflets; taper-pointed at the apex and cordate or rounded at the base; evenly and sharply serrate. When unfolding covered underneath with reddish hairs and becoming nearly white and glabrous at maturity. *Flowers:* yellowish green; growing in large, dense, terminal panicles, the fertile ones forming those that are the most compact. *Berries:* bright crimson; rounded or flattened and covered with long, reddish hairs; acrid; not poisonous.

Over the surrounding green of summer there is a warmth and richness of colour cast by the splendid hue of this plant's fruit, and the young growth of the tree is a vivid, bright red. This is, in fact, one of the beautiful and very noticeable small trees of the waysides and rocky thickets. Not infrequently, however, it descends to a shrub. The straggling and uneven growth of the tree, as it thrusts the ends of its branches outward, represent somewhat the horns of a stag, and they are similarly covered with a velvety coating. The name vinegar tree is due to the acidity of its fruit and twigs, which is the outcome of the innumerable fine hairs which cover them. From the young shoots the pith can readily be removed, and quills are thus made with which to draw out the sap of maple trees in the spring-time. Little country boys, however, convert them into pin or putty blowers, and, at the expense of the enemy, amuse themselves highly. Both the bark and the leaves of the tree are rich in tannin. Through the wood large ducts can be seen which designate clearly the annual layers of its growth.

Rhus hirta.

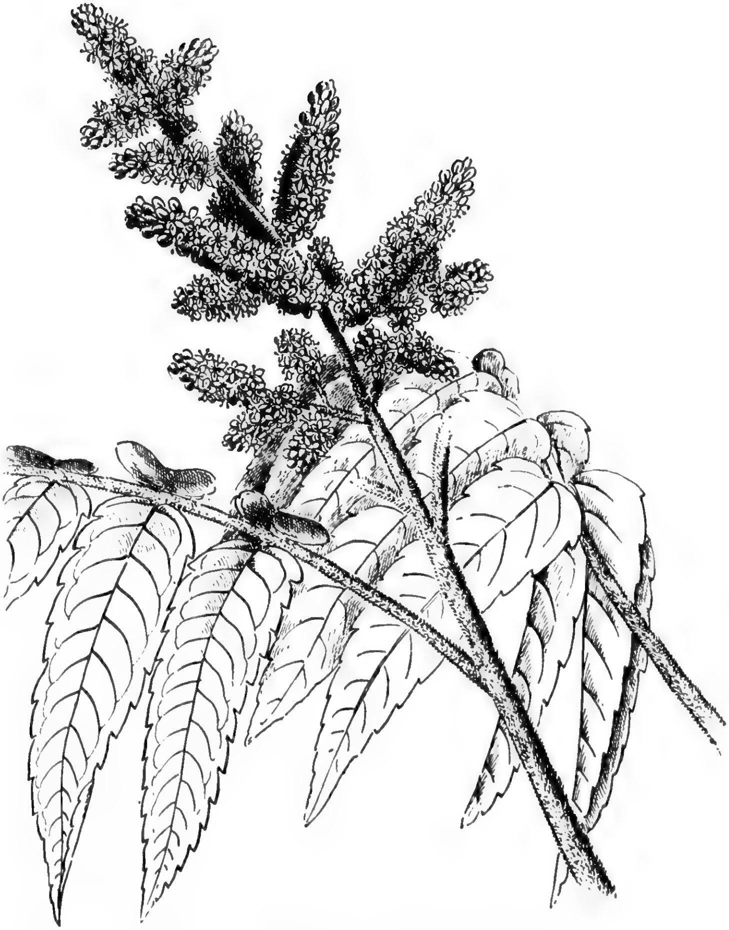


PLATE CLVII. STAGHORN SUMAC. *Rhus hirta.*

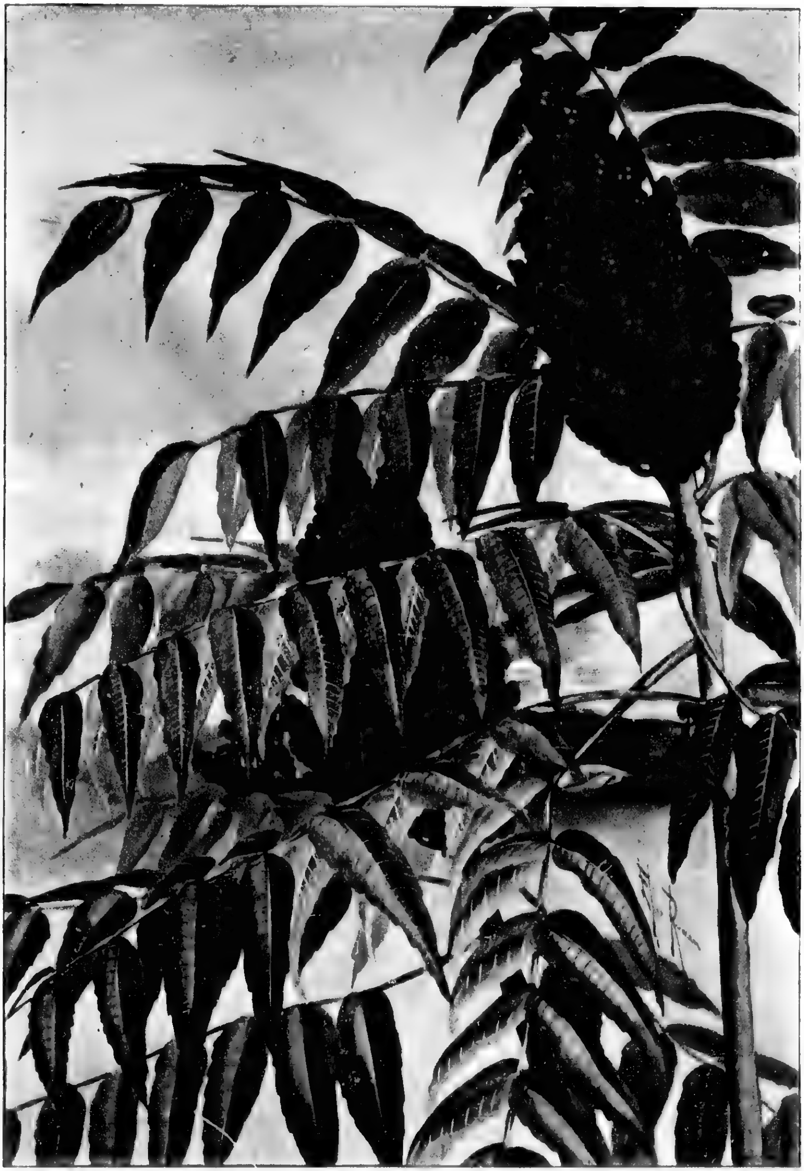


PLATE CLVIII. SMOOTH UPLAND SUMAC. *Rhus glabra.*

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SMOOTH UPLAND SUMAC. SCARLET SUMAC.

(*Plate CLVIII.*)

Rhús glàbra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Sumac.	*Spreading, bushy.*	2-20 *feet.*	*Maine southward to Fla. and westward.*	*June-Aug.*

Along the waysides and hugging the borders of fields this sumac raises itself so lustily and so often that there are few among us to whom it is not familiar. Too frequently, the ban of being poisonous is placed upon it, and this, it must be regretted, is the outcome of a melancholy lack of observation. The sharply serrated leaves, the terminal growth and shape of the closely packed bunches of beautiful, crimson fruit, are ever ready to help us in distinguishing it from the deadly poisonous sumac, *Rhus vernix*, which inhabits the swamps. It is interesting to notice in this species, as also in the staghorn sumac, that sometimes the whole or part of the flower-cluster has not been transformed into flowers, but has remained as small green leaves.

AILANTHUS. CHINESE SUMAC. TREE-OF-HEAVEN.

(*Plate CLIX.*)

Ailánthus glandulòsa.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Ailanthus.	*Round-topped, spreading.*	40-90 *feet.*	*Escaped from cultivation.*	*June, July.* *Fruit: Oct.*

Bark: brown; smooth. *Branchlets:* covered with whitish dots. *Leaves:* very large; compound; alternate; odd-pinnate; with from seventeen to forty-one leaflets, with short petiolules; the odd one often absent or dwarfed and coarsely toothed. *Leaflets:* lanceolate or long ovate; taper-pointed at the apex, and squared or slightly cordate at the base; entire, with one or two blunt teeth at each side near the base; feather-veined; bright green above, lighter below; thin and almost glabrous. *Flowers:* small; greenish yellow; growing in terminal, compound panicles. *Calyx:* of five minute sepals. *Corolla:* of five petals. *Stamens:* in sterile flowers, ten. *Fertile flowers:* with from two to five ovaries. *Samaras:* flat; the seeds growing in the centre of the thin, membranous wing.

The generic and Asiatic name of this remarkable tree is from "ailanto," which means, Tree of Heaven, and by the

Chinese in whose country it is a native, it is regarded with much affection. A Jesuit missionary is credited with having, in 1761, first sent its seeds to England. A little over thirty years later it was brought to America and took root near Philadelphia. Since then it has been considerably planted. In parts of Long Island, New York and New Jersey it is abundant. The tree is of striking, majestic presence, and its long, wand-like stems of leaflets form a responsive playing-ground for the breezes. When in full bloom the flowers have a feathery, fine appearance, but they are not handsome. Their odour also, and it is that of the staminate ones, is generally thought to be very disagreeable. They exhale one of the heavy, oppressive scents which close upon the atmosphere and prevent many from breathing it without feeling some physical distress. After the bloom has passed, however, the tree is without objectionable features.

Ailánthus glandulòsa.

When the great bunches of samaras begin to ripen, the pistillate trees are most conspicuous. From a summer green they vary in colour to red, and in drying they turn to a soft shade of tan. Often trees hung with red samaras and others hung with green ones stand side by side. The ailanthus seeds itself readily and is also reproduced by abundant suckers which arise from its base. In cultivation, where a fine, waving effect of shrubbery is desired, it can be gained by keeping the main stems of the trees cut down and allowing these shoots to grow to their utmost height.

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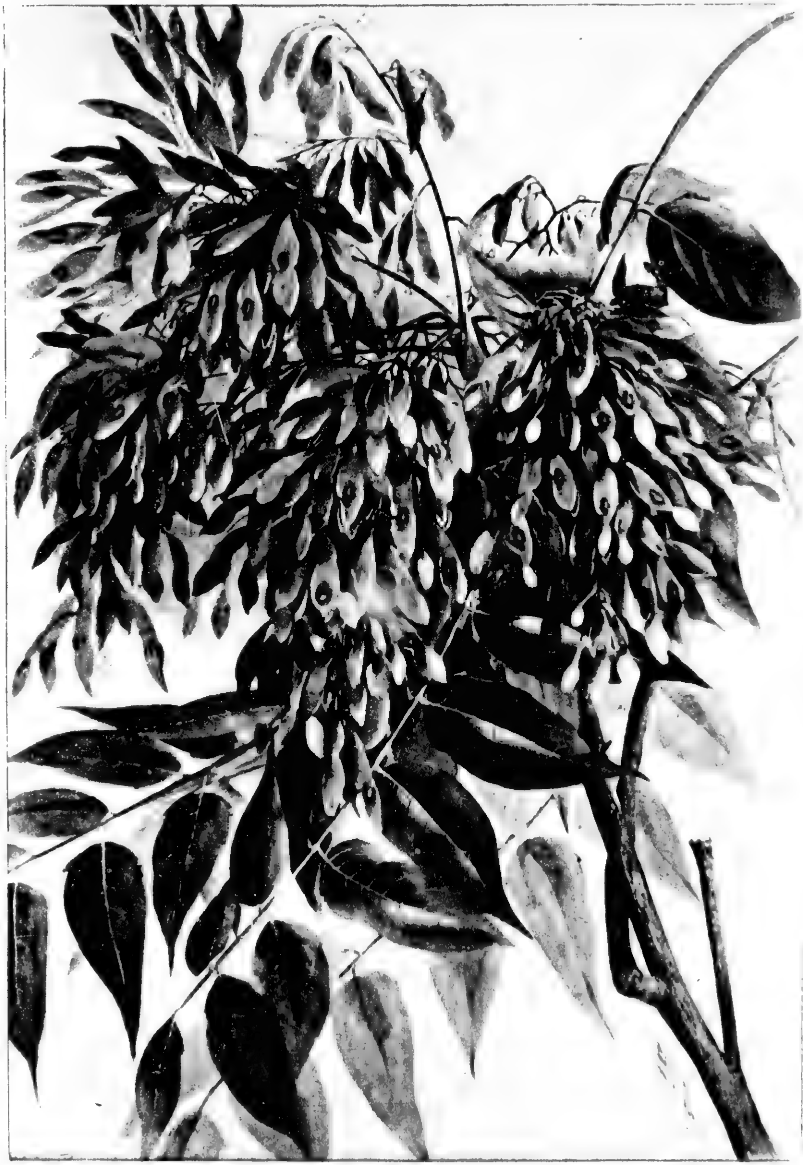

PLATE CLIX. AILANTHUS. *Ailanthus glandulosa.*

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PIG-NUT. BROOM HICKORY. (*Plate CLX.*)

Hicòria glàbra.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Walnut.	*Head, narrow; branches, slightly pendulous.*	60-90-120 *feet.*	*Maine westward and to Fla. and Texas.*	*April.* *Fruit: Oct., Nov.*

Bark: light grey; close, not shaggy. *Leaves:* compound; alternate; odd-pinnate; growing on smooth stalks and having from five to nine sessile leaflets, which are oblong, long-pointed at the apex and wedge-shaped, pointed or rounded at the base; the lower pair of leaflets much smaller than the others; sharply serrate; thick; dark yellowish green, and glabrous on the upper side at maturity; slightly tufted in the angles of the ribs on the under sides. *Flowers:* greenish yellow; growing in catkins. The staminate ones, three to seven inches long; the pistillate ones growing in spikes with from two to five flowers. *Fruit:* with a globose, or pear-shaped husk which is thin and splits open only at the apex, or to about the middle. *Nut:* oblong, with a smooth, unridged shell; thin. *Kernel:* small; very bitter.

All undoubtedly know the pig-nut, for it is generally impressed upon us by experience; and to the mind clings the remembrance of early days when its nuts were eaten in error for those of the good, old shagbark. Their bitter, disappointing flavour vaguely touches the palate with the very name of pig-nut. Throughout the northern states the tree is common and well known.

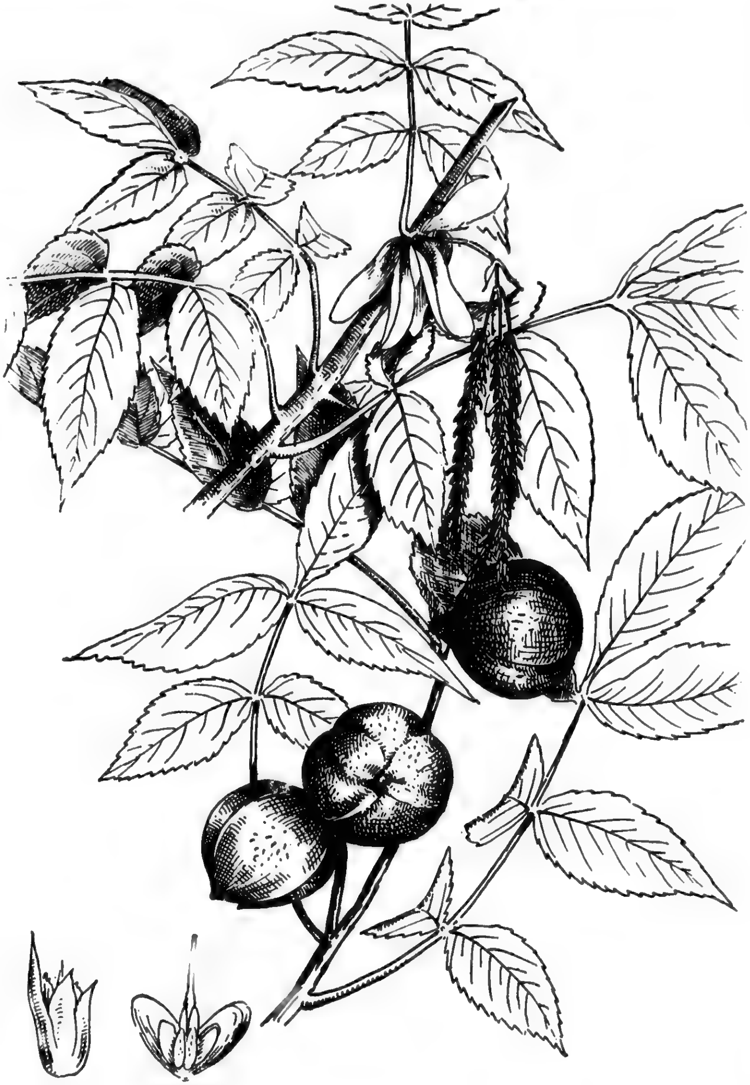
Commercially its strong, tough and flexible wood is not distinguished from that of the shell-bark hickories. For the handles of tools, agricultural implements and the making of many similar articles, it is useful.

HORSE CHESTNUT. (*Plate CLXI.*)

Æsculus Hippocàstanum.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Soapberry.	*Rounded, compact.*	30-40 *feet.*	*Introduced.*	*May, June.*

Bark: brownish. *Leaves:* palmately-compound; opposite; and having five, or more often seven long, oval leaflets; abruptly pointed at the apex and tapering at the base; ribs straight; the edges scalloped and toothed. When young pubescent with a brown wool. *Flowers:* large; cream-white, spotted with yellow and purple, and growing in a terminal thysus. *Calyx:* five-cleft. *Corolla:* of five spreading petals raised on short claws. *Stamens:* seven; exserted, with orange-coloured anthers. *Pistil:* one; included. *Fruit:* a round, green, prickly husk which encloses within its valves one or two nuts. *Nut:* mahogany colour; with a white scar on one side; lustrous when young, but becoming dull and wrinkled with age. *Kernel:* aromatic; poisonous and having a strong odour.



Pistillate flower. *Staminate flower.*

PLATE CLX. PIG-NUT. *Hicoria glabra.*

Throughout its entire career there is something very characteristic about the horse chestnut tree. The large, silky leaf-buds remind us of those of the magnolia as they unfold in the early spring, and as from them the beautifully formed leaflets begin to grow, we continue to notice how individual is the whole aspect of the tree. Everything that it does appears to be well planned and regular. The exquisite bunches of flowers have a unique way of pointing upward, and the fragrance that emanates from them is as good a guide to the tree's locality, as to see their shimmering light. Again the mahogany-coloured nut with its white scar is as unmistakable as the piebald horse of one's neighbour. It is rather disappointing to attempt to eat its abundant meat; for it is intensely bitter, although it is not, as has been thought by many, poisonous. In fact, on the continent, cattle, sheep and pigs are fed upon the nuts, and rooks devour them with avidity. They are moreover not without efficacy of another sort, for an ancient superstition assures us that to carry one constantly in the pocket will prevent rheumatism from attacking the wearer.

Æsculus Hippocàstanum.

The flowers of this tree appear to have been especially designed to suit the convenience of the bumble-bee that visits them so frequently. The protruding stamens and style do not interfere with him as he alights on the petals; he only brushes them a little with his under part and covers himself with pollen. His legs fit well into the spaces between the petals, and he is therefore able to settle himself quite comfortably. He then thrusts his proboscis into the honey-holding sac at the base of the flower, quickly draws it out and is away to another one. The rapidity with which he accomplishes this is truly astonishing. It is the work of only a very few seconds.

Although well known in this country the tree is not a native.

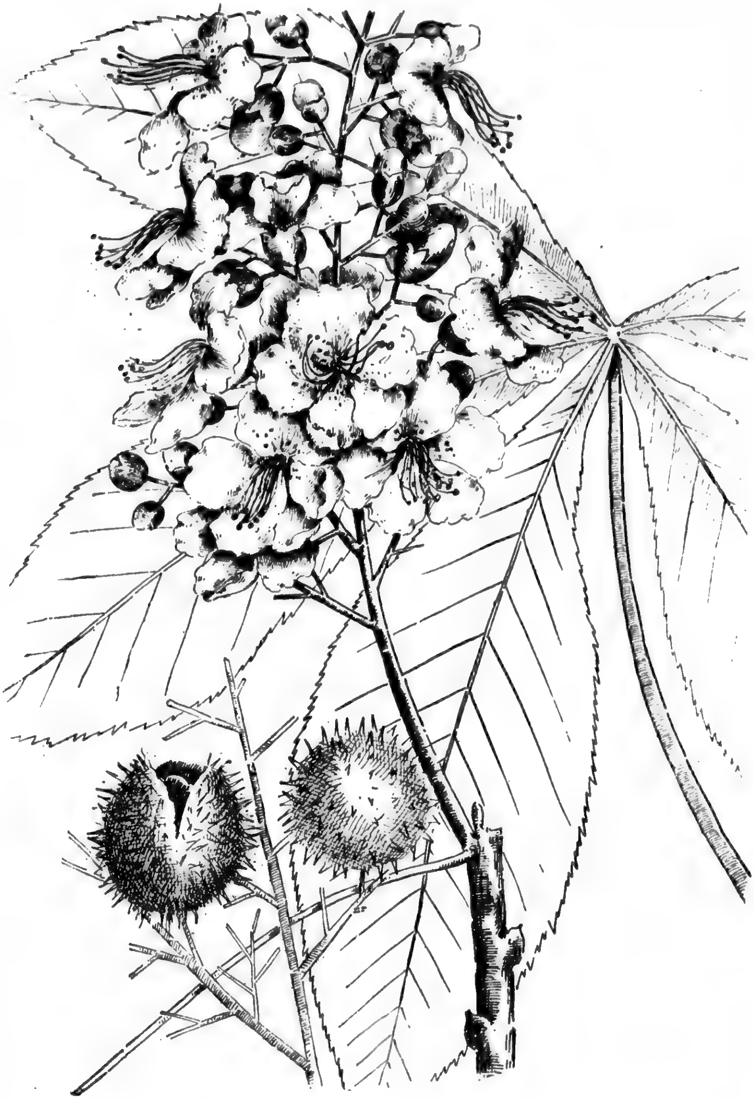


PLATE CLXI. HORSE CHESTNUT. *Æsculus Hippocastanum.*

By Professor Sargent it is said to be indigenous in the mountains of northern Greece. As a timber tree it is practically worthless. Buds, page 30.

Æsculus rubicùnda, red horse chestnut, is cultivated mostly for ornament, and for the sake of the contrasting colours of their flowers it is planted by the side of Æsculus Hippocastanum. The deep pink of its blossoms mingling with the bright green of its leaves, spotted here and there with red, is very lovely. The tree is never tall, sometimes hardly more than a shrub. Each flower has but four slightly spreading petals. Generally, it is thought to be a hybrid between the horse chestnut and *Æsculus Pavia*, red buckeye. This latter plant bears bright red flowers, and usually occurs as a shrub. Its best growth is in Virginia and southward.

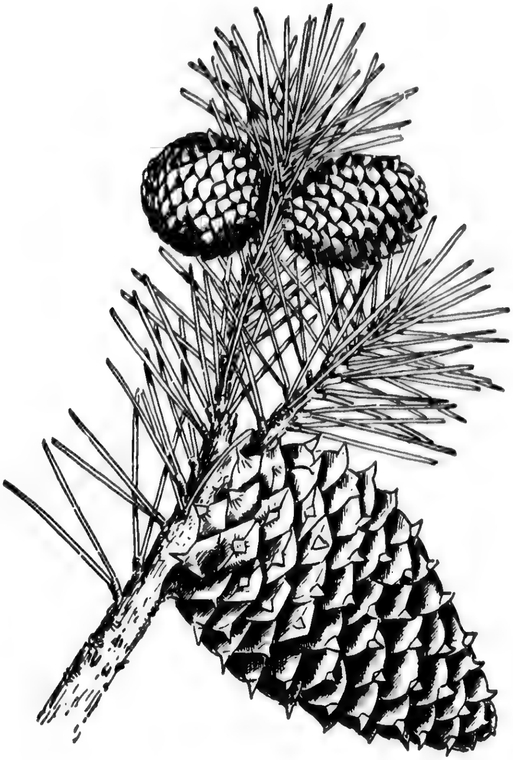
HICKORY PINE. TABLE-MOUNTAIN PINE. PRICKLY PINE. (*Plate CLXII.*)

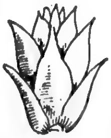
Pìnus pùngens.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Head, narrow: branches, short, ascending.*	10-60 *feet.*	*N. J. and Penn. to No. Carolina and Tenn.*	*May.*

Bark: reddish brown; when old, rough and broken into plate-like scales. *Leaves:* dark bluish green; seldom over two inches long; simple; growing closely along the branches in bunches of two or sometimes three, and having sheaths at their bases; needle-shaped, the outer side round and smooth, the inner side grooved: stiff. *Staminate flowers:* growing in long spikes. *Pistillate ones:* clustered in the young cones. *Cones:* pale, reddish yellow; three to four inches long; oblong or ovate; sessile, and frequently growing in clusters of four or more; heavy. *Scales:* woody, with a hooked spine nearly an inch long.

The great pines, so simple in construction, must always interest us, and from the larches, the firs, the cedars and the spruces, which also are members of the family coniferæ, we readily distinguish them because their leaves, although varying greatly in length, are needle-shaped and grow in clusters of from two to five. At their bases they are sheathed, or held together by a thin, membranous scale. When pressed together they form a cylinder.





Envolucre of staminate flower, enlarged.

Winged seed.

PLATE CLXII. HICKORY PINE. *Pinus pungens.*

Pinus pungens has a rather limited range. Its cones are very abundant and beautiful. After fertilization has taken place, and their scales have closed to protect the young and forming seeds, it is astonishing how hard and heavy they are found to be when taken in the hand. Almost they appear like bits of clay. Light brown and coarsely grained wood is produced by the tree, and it is soft and brittle. In Pennsylvania it is largely made into charcoal.

COMMON JUNIPER. GROUND CEDAR. (*Plate CLXIII.*)

Juniperus communis.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Low, broad, spreading.*	20-25 *feet.*	*Nova Scotia southward and westward.*	*April, May.* *Fruit: Oct.*

Bark: reddish brown and separating into thin, papery sheets. ***Leaves :*** simple; linear-lanceolate or awl-shaped; spreading and growing in whorles of three up and down the slender branchlets ; rigid; sharply pointed; channelled; dark yellow-green and glaucous on the upper side; astringent. ***Berries :*** large; sessile; bluish grey; glaucous ; fragrant when dried; sweet.

By Professor Sargent it is said that Juniperus communis is the most widely distributed tree of the northern hemisphere It occurs in Europe and Asia also. In India its twigs are burned as incense, and its berry-like cones are employed in the practice of medicine. In this country the latter are considerably used to flavour gin, and they take in New England fully three years in which to mature. The tree is erect with an irregularly shaped head, and it is not infrequently found growing by the side of *Juniperus Virginiana.* *Juniperus nana*, the low juniper, thrives in pastures and on dry hillsides as a shrub, when its branches grow low, often closely to the ground.

"The birch-tree swung her fragrant hair,
  The bramble cast her berry,
The gin within the juniper
  Began to make him merry.
The poplars, in long order due,
  With cypress promenaded,
The shock-head willows two and two
  By rivers gallopaded."—TENNYSON.

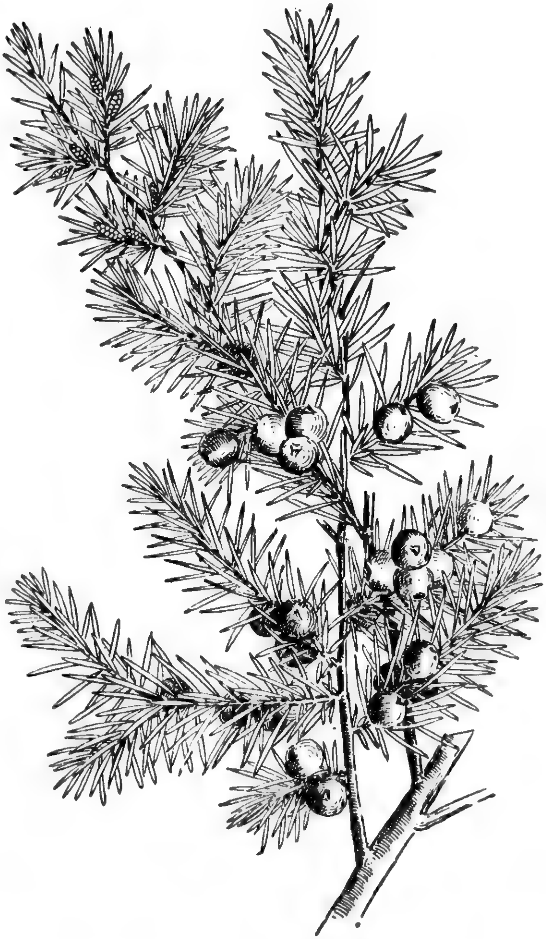


PLATE CLXIII. COMMON JUNIPER. *Juniperus communis.*

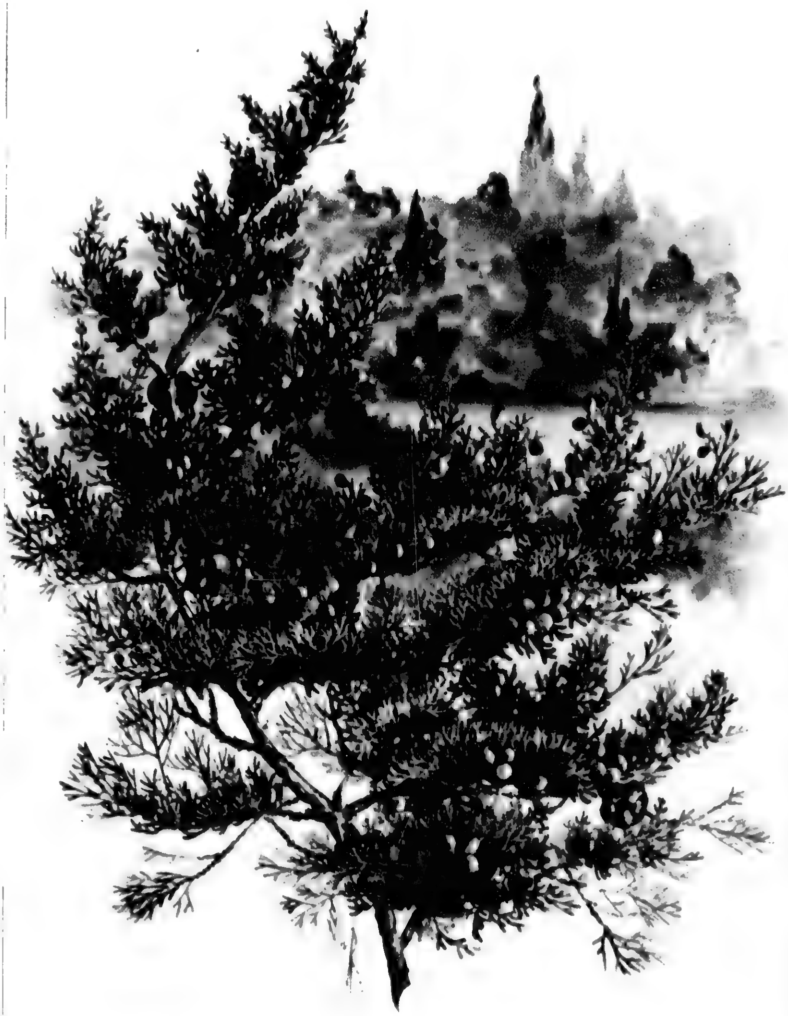


PLATE CLXIV. RED CEDAR. *Juniperus Virginiana.*

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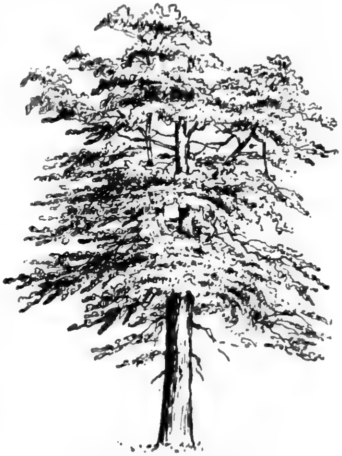
RED CEDAR. SAVIN. (*Plate CLXIV.*)

Juniperus Virginiàna.

FAMILY	SHAPE	HEIGHT	RANGE	TIME OF BLOOM
Pine.	*Conic, irregular when old.*	15-30-100 *feet.*	*General.*	*April, May.* *Fruit: Sept., Oct.*

Bark: reddish brown, and separating into long shreds. *Inner bark:* smooth; polished. *Leaves:* minute; dull green; simple; opposite in pairs; ovate; overlapping each other, and growing in four rows on the rather square, fine branchlets; stiff; sharp. When young the leaves spread out somewhat from the branches, which are then more rounded, and are needle-shaped. When pulled away from the branch it can be seen that they grow in pairs, or sometimes threes. *Berries:* small; bluish grey; growing erectly and closely along the branchlets.



Juniperus Virginiàna.

From the coloured plate something of the beauty of the pistillate cedar tree may be gathered when its olive-green foliage is alive with the brightness of its berries. The staminate trees are of a rather rusty brown tone, and although they are not generally regarded as attractive, there are many that delight in their unsymmetrical and rather weird style of growth. The tree, as *Juniperus communis*, is more widely distributed than any other coniferous one of North America. Its versatility and knack of adapting itself to various conditions of climate and soil are truly wonderful. From a low bush it ranges in size to a great tree with a fine, straight trunk, and it is either pyramidal or rounded. Throughout New England and New Brunswick it favours dry soil; in the valleys of Pennsylvania it seeks that which is alluvial. On the limestone hills of Kentucky and Tennessee are the "cedar brakes"; while in Florida the tree grows to a great size in swamps and in bottom lands. Throughout the

Rocky mountains, in the extreme northwest and in southern California it seeks such haunts as suit its fancy.

The formal outline of the tree is valuable in landscape gardening when it is desired to produce rugged effects. Often we then see it cut into fantastic shapes, a trick learned from the Japanese by the Dutch, and it is sufficiently hardy to stand well this suppression of its natural growth.

For a long time the Indians have delighted in its bright red, fragrant and spicy wood which does not decay, and, as it is objectionable to moths, cedar chests and closets are appreciated by thrifty housewives. Its principal use, however, is in the making of lead pencils. Of the heterogeneous community that daily wields thousands of them, it is a matter of interest to wonder how many ever cast a glance of recognition, or expend a thought upon the tree that has so abundantly yielded of its best.

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WHEEL-SHAPED, 13.
Whorled, 3.
Wings, 14.